

Short-term rentals in New York City

An economic analysis of proposed rules

Prepared for

Airbnb

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1. INTRODUCTION

1. My name is Michael A. Salinger. Airbnb has engaged me and a supporting team of economists from Charles River Associates (CRA) to review and comment on the likely economic impact of the rules proposed by the New York City (NYC) Mayor's Office of Special Enforcement (OSE) for implementing Local Law 18/2022.
2. I am the Jacqueline J. and Arthur S. Bahr Professor of Management, Professor of Economics, and Chair of the Department of Markets, Public Policy, and Law at the Boston University Questrom School of Management. From 2005 to 2007, I was Director of the Bureau of Economics at the Federal Trade Commission (FTC) where I played a major role in the FTC's competition advocacy including around the impact of regulations on competition. I am widely recognized internationally as an expert on the economics of competition and competition policy. I have a large body of published research on competition policy. I have taught MBA courses on public policy toward business. My CV and biographical notes for the CRA team are provided in Appendix A.¹
3. The proposed rules impose requirements on short-term rental (STR) hosts and STR booking services such as Airbnb. With respect to hosts, among other things, the proposed rules require STR hosts to pay to register with OSE, establish requirements for becoming registered (and attaining a registration number), require hosts to adhere to certain rules such as to not allow guests to lock their doors, and impose penalties of, in some cases, up to \$5,000 for repeated violations of the rules (including technical errors as well as deliberate attempts to circumvent the law). The proposed rules require booking services to, among other things, verify that any STR booked over their platforms either is in a Class B multiple dwelling or is registered with OSE as confirmed by a four-point matching verification system, and submit to OSE a monthly record of their STR transactions in NYC. They also impose penalties on booking services for violations.
4. My assessment is that the proposed rules are a disproportionate and harmful way to achieve any goals that the City may assert to justify them. The proposed rules take a blanket approach and are likely to have the effect of deterring beneficial activity that cannot plausibly affect the supply of permanent housing. By doing so, the rules will have negative effects on New Yorkers by preventing efficient use of the housing stock and by deterring tourism.
5. In this introduction, I summarize my reasoning for reaching this view.
6. **My framework for assessing the rules.** To be consistent with accepted rulemaking practices and principles of economic soundness, agency rules regarding enforcement of existing STR restrictions should be proportionate and appropriately trade off the benefit of deterring and punishing harmful activity while not discouraging beneficial STR activity that makes more efficient use of the housing stock and contributes to greater housing affordability.
7. Economically sound enforcement rules consider the objectives behind the law that purports to justify the enforcement effort. With respect to rules for enforcing Local Law 18, one needs to consider how they will impact different categories of STRs. One example is the extent to

¹ The CRA team consists of Dr. Oliver Latham, Muath Masri and other economists at CRA.

which the proposed rules impact those rentals that might achieve the purported objectives of the law and whether they might discourage legal and beneficial STRs. Rules that curtail beneficial activities without promoting the underlying objectives of the law should be avoided.

8. I applied this framework regularly during my work on competition advocacy at the FTC, and it is consistent with the framework that courts (including the Supreme Court) have used in establishing legal standards for review of agency rulemaking.² It is also the right framework to protect citizens against the well-known tendency of legislative and regulatory proceedings to promote the goals of well-organized special interests to the detriment of the public at large.
9. My analysis proceeds in three steps:
 - First, I consider the likely impact of the proposed rules on the volume of STR listings and whether their deterrence effect will apply only to the listings the ordinance is intended to prevent (e.g., housing units that would otherwise be used for permanent housing) or whether it will apply also to STRs that are likely to be socially beneficial.
 - Second, I conduct an empirical analysis of the composition of STRs in NYC and assess how many can have negative effects on housing affordability and how many are not likely to have these effects.
 - Third, I document the benefits of STRs to the tourist economy in NYC, noting that the tourist sector extends beyond the hotel sector to the other sectors that depend on tourism dollars.
10. **Even if the proposed rules could be justified by concerns about the potential effect of STRs on permanent housing supply or rental prices, removing or discouraging STRs that would not otherwise be used for permanent housing will do nothing to accomplish the goal of making permanent housing more affordable.** Further, some STRs will generate additional income for residents which will tend to make their homes or apartments more affordable, not less.
11. **Experience from prior implementation of a NYC STR reporting law implies that the proposed rules, which include extensive and burdensome requirements, are likely to have a very large negative effect on STR activity.** I study the effect of certain 2020 legislation that required booking services, including Airbnb, to disclose information to OSE about certain STR listings. To comply with those requirements, Airbnb required NYC-based hosts to consent to the sharing of their personal information and listing activity with the City of New York. I find that this change reduced Airbnb listings in NYC by 21%. Because other large cities did not experience a similar drop at the same time, the reduction in NYC was likely the result of the legislation.
12. The proposed rules impose additional burdens on hosts. They must pay an application fee of \$145 every two years, must provide extensive information, must collect detailed reservation records and retain them over a seven-year period, and are at risk of substantial fines for even inadvertent breaches of the rules. The already-large impact observed following implementation of the 2020 legislation supports an inference of a strong likelihood

² The formal term for this framework, which entails trading off the frequency and cost of “false positives” and “false negatives,” is “decision theory.”

that the proposed rules will have a substantial negative impact on hosts' ability and willingness to rent STRs in NYC.

13. The argument that such an impact is a necessary and unavoidable outcome of the underlying legislation is not persuasive. The deterrent effect of the proposed rules applies to all STRs, even those which are socially beneficial. The proposed rules will disproportionately affect STRs of properties that are rented out for only a portion of the year because many of the requirements (e.g., the information disclosure requirements, the fees) are effectively "fixed costs." Such STR activity is beneficial and is unlikely to affect the long-term housing stock. One cannot simply ignore the likely effect of the rules of deterring STRs that provide benefits and do not contribute to the harms that may purportedly justify the law's passage. Rather, one needs to take these undesirable effects into account and weigh them against any expected benefits.
14. **In my analysis of Airbnb data, I find that most STRs in New York City would not be otherwise made available as long-term rentals and so cannot contribute to reduced housing affordability. Indeed, they are likely to benefit affordability by making more efficient use of the housing stock.** For example, a resident who hosts house guests in a spare room some nights during the year but would like to rent out the room on the others would be unlikely to rent the room out permanently. Preventing STRs in this category cannot raise affordability and will have other negative effects. My empirical analysis seeks to determine what fraction of the listings on Airbnb would likely generate more income if their owners rented them out on a long-term basis.
 - Using Airbnb data, I analyze how many STR listings are booked out frequently enough to earn more revenue from STRs than they could realistically generate if rented out on a long-term basis. Those STRs which are rented out less than this "break-even" amount likely have other, non-financial reasons for being rented out as STRs instead of long-term rentals (LTRs) and are therefore unlikely to enter the supply of permanent housing if STRs were discouraged or eliminated.³
 - Because the owners of over 80% of the units in NYC offered on Airbnb could earn more money by renting on a long-term basis, they presumably have a non-pecuniary reason for not renting on a long-term basis. As a result, precluding (or discouraging) them from offering their units on a short-term basis is unlikely to make them add their units to the supply of permanent housing. These observations are consistent with those published elsewhere such as in a report on STRs by the Mayor's Office of Housing to the Boston City Council⁴ and other studies in the literature.⁵

³ In addition to data from Airbnb, I use data from Zillow and the American Community Survey data. For each Airbnb listing, I estimate its total STR earnings divided by the number of nights booked. Then, I calculate the rental income the host could generate from an LTR in the relevant NYC ZIP code using the Zillow Rent Index. The break-even number of nights is then calculated as the number of nights a STR would need to be booked to generate as much revenue as the LTR. This break-even number of nights is then compared to the number of nights listings are booked and available on Airbnb.

⁴ Mayor's Office of Housing, "Short-Term Rentals 2022 Report to the Boston City Council" (June 29, 2022), p. 9.

⁵ Peter A. Coles, Michael Egesdal, Ingrid Gould Ellen, Xiaodi Li, and Arun Sundararajan, "Airbnb Usage Across New York City Neighborhoods: Geographic Patterns and Regulatory Implications" (October 12, 2017), *reprinted in The Cambridge Handbook of the Law of the Sharing Economy* (Davidson, N.M., le Finck, M. & Infranca, J.J., eds.) (2018).

- I also present evidence that STRs generate a revenue stream for hosts that will tend to improve affordability. The median annual income for hosts (from hosting) in NYC was around \$5,000 in 2021. Excluding the income earned from Airbnb would increase the share of income paid by hosts on rent from 46% to 55%. Host surveys conducted by Airbnb in 2021 indicated that Airbnb helps cover rising costs for 41% of hosts and helps 37% of hosts make ends meet.
 - NYC residents themselves will sometimes benefit from the existence of STRs, for example if they need a STR while they arrange home renovations or because their normal residence is unsafe or otherwise unavailable. Consistent with STRs not just being used by tourists, I understand that 85,300 Airbnb bookings were made in NYC in the last 12 months by NYC residents.
15. **A restriction of STRs will have a damaging impact on the city’s tourism sector, the vast majority of which is unrelated to hotels.** Restrictions on STRs are likely to benefit hotels by reducing competitive pressure, but they are likely to have a negative effect on the tourism sector overall and hence on the city at large.
- First, I present evidence of how STRs can provide important “surge capacity” that provides tourist accommodation at times of peak demand. For instance, during the peak periods in a year where hotel occupancy rates soar above 90% and the rates of hotels are at the highest, the supply of STRs tends to increase. This increase in supply improves choice for tourists, both attracting a greater inflow of tourists into the city and enabling them to spend more on other tourism-related goods and services in the city.
 - Second, I present data from independent sources that most tourism spending and economic activity occurs outside of hotels and lodgings. Around 72% of the \$48 billion spent on tourism in the city in 2019 was related to non-lodging-related activities. Thus, even if the reduced competition benefits hotels, the resulting reduction in the number of visitors does great damage to the tourism economy.
 - Third, the presence of STRs in boroughs outside of Manhattan has a positive spillover benefit on both tourism-related firms and their employees, specifically in Queens where 14% of all labor income generated in 2019 was attributable to tourism.
 - Finally, I note that the scalable nature of STRs means that using STRs to provide surge capacity in periods of peak demand is likely to make better use of real estate and be a preferable approach from the point of view of housing affordability than relying on hotels. For instance, hotel development between 2010 and 2016 resulted in a loss of 750,000 square feet of existing residential space.
16. The rest of this document follows the structure of this introduction. Section 2 sets out my economic framework to assess the proposed rules. Section 3 discusses the likely impact of the proposed rules on the supply of STRs in NYC. Section 4 sets out several necessary conditions for STRs to increase or reduce housing affordability and the empirical data on which STRs in NYC may meet these conditions. Section 5 discusses the impact of STRs on tourism. Section 6 concludes.

2. PRINCIPLES FOR EVALUATING ECONOMIC EFFECTS OF THE PROPOSED RULES

17. In this Section, I set out the economic principles for evaluating policies and rules for enforcing a law and for judging whether such policies and laws are in the public interest. In making the trade-off between deterring and punishing illegal activity while not discouraging legal activity, one must consider not only the letter of the law but also the objectives behind it. With respect to the proposed rules for enforcing Local Law 18, one needs to consider how they will impact different categories of short-term rentals (STRs). One needs to consider the extent to which the rules are necessary to accomplish the objectives of the law and whether they might discourage legal and legitimate STRs. NYC should avoid rules that curtail legitimate and beneficial activities without promoting the underlying objectives of the law.
18. This framework for evaluating enforcement is the general framework that I used for all policy evaluation at the FTC as well as in my publications. It is also a framework that courts (including the Supreme Court) have used in establishing legal standards.⁶ More specifically, one of the missions of the FTC is competition advocacy with respect to state and local laws and regulations. One might question why a federal agency should ever engage in competition advocacy with respect to state and local laws and regulations. The rationale is a well-known bias in legislative and regulatory proceedings for promoting well-organized special interests to the detriment of the public at large. As Nobel Laureate George Stigler observed in his seminal article on the economic analysis of regulation, "...[E]very industry or occupation that has enough political power to utilize the state will seek to control entry."⁷ Because STRs facilitated by rental listing services such as Airbnb compete with hotels, a natural concern about any proposed regulation of STRs is that it will limit competition with hotels rather than promote the public interest.
19. The "Rules Governing Short-Term Rentals" would implement a law that the New York City Council has enacted.⁸ In evaluating whether the rules are reasonable and in the public interest, it is not sufficient to argue that they will aid OSE in its enforcement of that law or other existing laws that purportedly restrict STRs in New York City.
20. Rules implementing laws are inherently imperfect. First, they impose costs. In addition, they can result in both under- and over-enforcement. Over-enforcement is not restricted to cases an enforcement agency brings against lawful behavior. It also arises when either fear of enforcement or the cost of compliance prevents legal behavior. Such over-enforcement is

⁶ The formal term for this framework, which entails trading off the frequency and cost of "false positives" and "false negatives," is "decision theory."

⁷ George J. Stigler, "The theory of economic regulation," *The Bell Journal of Economics*, vol. 2 (1971), pp. 3-21, at 5.

⁸ I understand that in 2010, New York State (NYS) amended its Multiple Dwelling Law to outlaw unhosted STRs in certain multiple dwellings. In addition to NYS law, I understand that OSE's rulemaking takes the position that other local laws and codes, including the NYC Housing Maintenance Code and Building Code, impose further restrictions on STRs and extend the prohibition on unhosted STRs to private dwellings such as one- and two-family homes.

especially harmful when the benefits of the legal behavior extend beyond those engaged in the behavior.⁹

21. When weighing these factors – the cost of allowing violations to go unpunished and to continue, the cost of deterring legal and potentially economically beneficial behavior, and the direct cost of complying with regulations – it is important to consider not only the frequency of under- and over-enforcement but also the cost of the violations that occur and the benefits of legal behavior that is deterred.
22. In conducting such analysis, one cannot simply observe that unhosted STRs are illegal and therefore the cost of under-enforcement is high. Rather, one needs to understand the scope of and rationale behind prohibitions on unhosted STRs and formulate rules in light of that legislative purpose that also take into account the impact of curtailing beneficial STR activity. And one should consider whether an effective ban on unhosted STRs is itself overly broad (particularly in light of the possibility that well-organized special interests may benefit from over-enforcement).
23. In this report, I focus on the concerns around housing affordability. Other concerns that could be asserted to justify the proposed rules may be addressed by other means, and though they may be analyzed from an economics perspective, they are not within the scope of the analysis I have been asked to conduct for purposes of this report.
24. In what follows, I will assume that NYC may assert that the proposed rules are justified by a legitimate interest in preventing the diversion of housing units from long-term use to STRs. However, as my analysis will show, most STRs do not give rise to this harm.
25. At the same time, booking services like Airbnb facilitate mutually beneficial transactions between hosts and guests and they bring tourist traffic to New York City. Because these effects provide an economic benefit to New York City and its residents, NYC should consider them in designing its regulations governing STRs. As a result, in evaluating the proposed rules, one needs to consider the extent to which the rules will advance NYC's legitimate concerns as well as the extent to which they will prevent beneficial STRs.

Comparison with the existing legal framework

26. I understand the economic framework I have set out above to be consistent with a prior legal ruling about New York Local Law 146, which required monthly disclosure of host data. In 2019 Airbnb (as well as another booking service, Homeaway) challenged Local Law 146.¹⁰ The court made several points that are relevant for evaluating OSE's proposed rules.
27. First, in assessing whether Local Law 146 should be enjoined, the court considered the burden of compliance that the rules imposed on Airbnb and others. It also considered whether the City had alternative enforcement tools. In ruling that the hardships imposed by the law warranted preliminary relief for booking services, it wrote:

"To be sure, the City has a legitimate interest, during this period, in enforcing laws such as the Multiple Dwelling Laws to the extent breached by participants in the home-sharing market. But the City's regulator responsible for enforcing these laws,

⁹ To use economic terminology, over-enforcement is particularly harmful when the behavior at issue creates positive externalities (i.e. if it generates spillover benefits for society at large beyond those engaged directly in the transactions being regulated).

¹⁰ *Airbnb, Inc. v. City of N.Y.*, 373 F. Supp. 3d 467 (S.D.N.Y. 2019).

OSE, already possesses other tools to gather evidence of violations of these laws.¹¹ (emphasis added)

28. Second, the court's analysis considered the public interest:

"To be sure, the public has an interest in preventing the social ills that may result from the proliferation of short-term rentals in ways that violate the Multiple Dwelling Laws" ... "But, as noted, the issuance of a preliminary injunction ought not to significantly impair the City's ability to safeguard those interests during the pendency of this litigation, as the City retains its existing investigative tools such as subpoenas, and is at liberty to enhance the resources dedicated to this area if it determines that such serves the public interest".¹²

29. While giving due deference to elected bodies to determine the public interest, one should also be mindful of the possibility that laws may be applied in a way that caters to special interests rather than the public at large. As noted above, the reason the FTC engages in competition advocacy with respect to state and local laws and regulations is to counteract the political bias toward promoting well-organized special interests against the more dispersed interest of the public at large.

Overview of my analysis

30. In light of the framework above, my analysis proceeds in three steps. First, I consider the likely impact of the proposed rules implementing Local Law 18 on the volume of STR listings and whether its deterrence effect will be felt only on the listings the proposed rules aim to prevent (e.g., listings of housing units that would otherwise be used for permanent housing) or whether it will be felt also by other STRs. Second, I present empirical analysis of the proportion of STRs which are likely to raise the issues of housing affordability and whether there are other STRs that will not have these potential negative effects. Third, I document the benefits of STRs to the tourist economy in NYC noting that the tourist sector extends beyond the hotel sector to the host of sectors that depend on tourism dollars. Throughout, I rely on my own economic analysis as well as results in the existing academic literature.

3. THE PROPOSED RULES WILL DETER HOSTS AND SEVERELY LIMIT BENEFICIAL STR ACTIVITY

31. I consider how much rules implementing Local Law 18 are likely to deter STR activity. I do this by analyzing first how much the implementation of an earlier law – Local Law 2020/064 – impacted the number of listings on Airbnb. I then consider the incremental regulatory costs applied by the proposed rules. Finally, I consider how the deterrent effect of the proposed rules is likely to compare for different types of STRs.
32. I find that Local Law 64 reduced Airbnb listings by approximately 21%. Given that the proposed rules enforcing Local Law 18 add very substantial financial and administrative costs and associated risks, I consider they will likely have a large negative effect on the volume of STR activity in NYC.

¹¹ *Airbnb, Inc. v. City of N.Y.*, 373 F. Supp. 3d 467, 500 (S.D.N.Y. 2019).

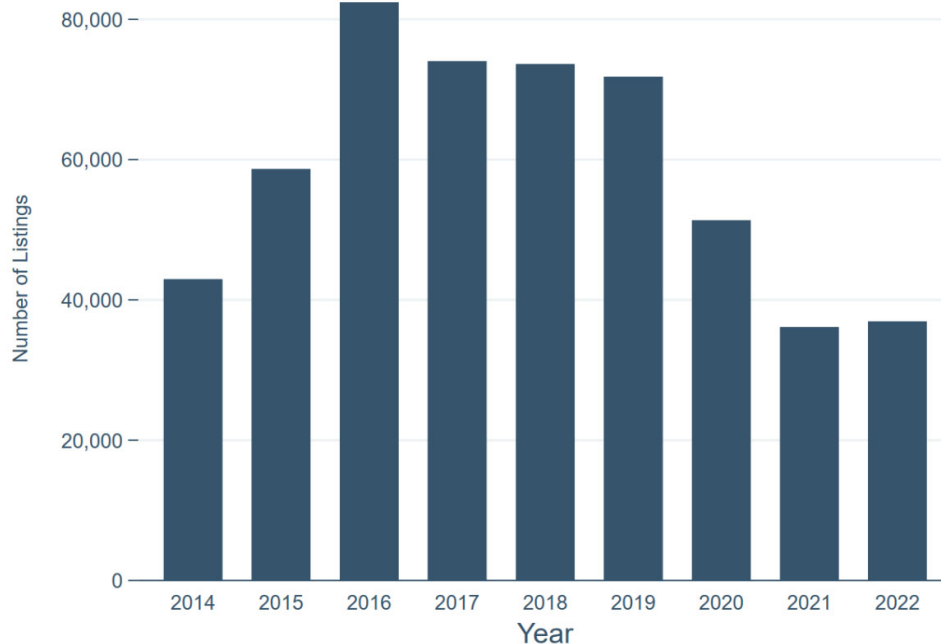
¹² *Airbnb, Inc. v. City of N.Y.*, 373 F. Supp. 3d 467, 501 (S.D.N.Y. 2019).

33. I also note that the proposed rules' administrative requirements are likely to be particularly burdensome for STRs which have no relation to the policy objective of improving housing affordability. This is because those additional requirements – including application fees and cumbersome registration forms – essentially constitute a “fixed cost” which will be most salient for the hosts handling the fewest bookings, who are least likely to offer that space in their homes for permanent rent.

3.1. Overview of Airbnb Activity in NYC

34. Before considering the past impact of rules implementing Local Law 64 and the likely future impact of the proposed rules implementing Local Law 18, I provide an overview of Airbnb's activity in New York City. Figure 1 below shows the number of total “Active Ever Booked Listings” (AEBLs) on Airbnb in NYC between 2014 and 2022. AEBLs are listings that are active (i.e., available for booking) at any point in the year and have been booked at least once in the past.
35. As shown below, in 2014, there were just above 40,000 total listings on Airbnb which increased to a maximum of just above 80,000 listings in 2016, the year New York State amended the Multiple Dwelling Law to make it illegal for booking sites to advertise unhosted STRs. The number of STR listings dropped significantly in 2020, the first year of the COVID-19 pandemic. After the pandemic, in 2022, the total number of listings has not recovered to 2019 levels and is currently at around 36,000.

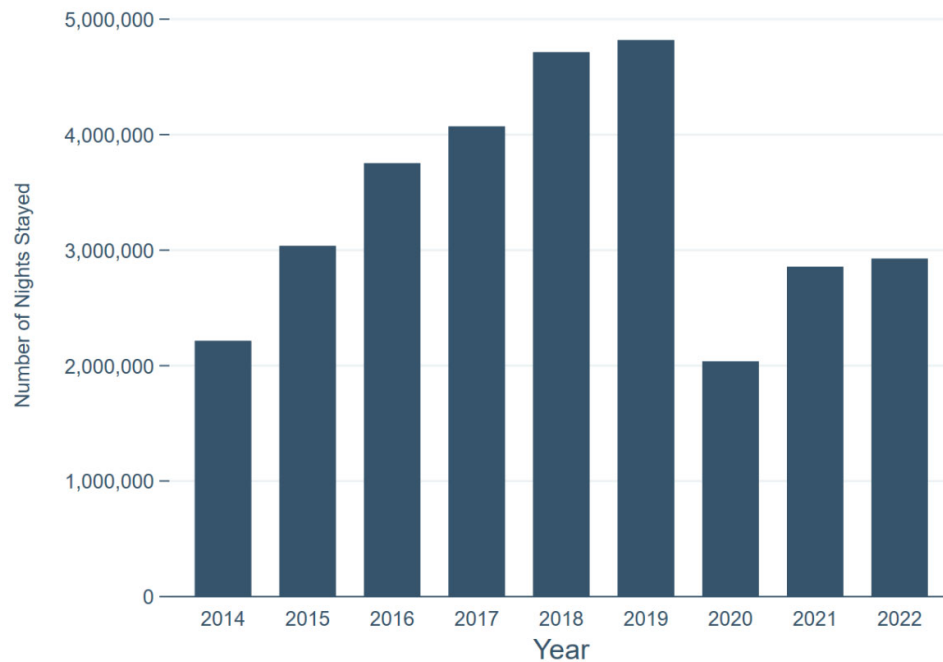
Figure 1: Number of listings in NYC on Airbnb, 2014 – Sept. 2022



Source: CRA analysis of Airbnb data.

36. Figure 2 shows the number of nights stayed over time in NYC. As shown below, the number of nights stayed in 2021 was still around half of pre-pandemic levels. Comparing January to September of 2019 to January to September of 2022, the number of nights stayed in 2022 is around 80% of pre-pandemic levels.

Figure 2: Number of nights stayed in NYC, 2014 – Sept. 2022

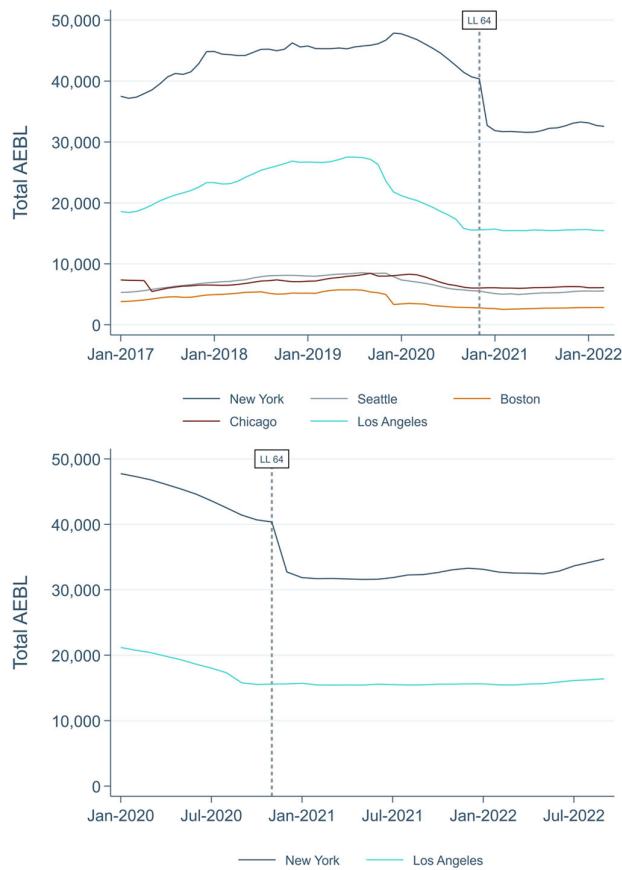


Source: CRA analysis of Airbnb data.

3.2. The prior rules implementing Local Law 64 significantly reduced listings on Airbnb

37. As of January 3, 2021, Local Law 64 required booking platforms, including Airbnb, to disclose information to OSE on a quarterly basis about certain STR listings. To comply with that law, Airbnb required NYC-based hosts to consent to having their personal information and listing activity shared with New York City.
38. Assessing the precise impact of Local Law 64's implementation in NYC is complicated by the impact of the COVID-19 pandemic. To try and determine the causal impact of Local Law 64 on STR bookings and listings in NYC, I have conducted an analysis which benchmarks the number of Airbnb listings in NYC to those in other major US cities. This technique, termed a "difference in differences" design, is a standard economic procedure. The intuition is that one can use the performance of a "control group" (e.g., other US cities like Los Angeles and Chicago) unaffected by an event (in this case, Local Law 64) as a benchmark for how the "treatment group" (NYC) would have evolved but for the event in question.
39. I conduct this analysis in Figure 3 below. The top panel tracks the properties that are available to be booked each month for five different cities across the US. The pre-pandemic pattern for NYC differed significantly from those for Boston, Chicago, and Seattle, but was virtually identical to the pre-pandemic pattern for Los Angeles.
40. While NYC and Los Angeles had similar trends in the number of listings pre-Local Law 64, they diverged substantially soon after the Law came into effect. Indeed, while NYC properties available fell abruptly around the time of the Law, listings in Los Angeles actually increased. Boston, Chicago and Seattle also did not experience a comparable drop to NYC.

Figure 3: Total properties available before and after LL 64 (2020) – New York and Los Angeles¹³



Source: CRA analysis of Airbnb data.

41. The data in the charts shows that the number of non-Class B Airbnb listings dropped by 25% after the passage of Local Law 64 in New York City. Using a more formal “difference-in-differences” estimation, the number of listings deactivated as a direct consequence of the law is estimated to be 21% of the listings prior to the law.

3.3. The proposed rules impose significant costs, administrative burdens and risks, and thus are likely to have a negative effect on listings

42. The proposed rules introduce significant new requirements and costs on hosts.
43. **New duties on hosts.** The changes due to the proposed rules include:
- Hosts need to supply a full application including multiple components to register with the OSE.

¹³ For purposes of this Figure, the definition of AEBL is listings that are active (i.e., available for booking) at any point in a month and have been booked at least once in the past (i.e., a listing would be included in a certain month only if it is active in that month). Class B properties are excluded from NYC listings, though the results are substantially the same regardless of the exclusion.

- Hosts must supply OSE with personal information, such as the identities of the members of the host's household and the length of the host's residence in the dwelling, to which OSE never previously had access (including under Local Law 64).
- Hosts must keep OSE apprised of most changes to the information they supplied during registration, including changes in the composition of their household.
- Hosts must pay a \$145 application fee upfront every 2 years.
- Hosts must make changes to their dwelling including posting fire escape maps and displaying their registration certificate prominently in the property.
- Hosts must also attest that they agree to adhere (and, for registration renewal, that they have in fact adhered) to a wide range of vaguely described local laws and regulations relating to STRs.
- Hosts need to prove their identity and occupancy, as well as provide information that certifies that they are the legal owners or tenants of the dwelling and that they are not prevented from hosting STRs by their lease or other contract, if applicable.
- Hosts must report to OSE all listings prior to their use.
- Hosts must keep a transaction-level record of each booking and pay-out for 7 years. Upon OSE's request, hosts must provide that data to OSE within 10 business days.

44. **New penalties.** Under the proposed rules, any person who rents out a dwelling without valid registration or falsely represents the registration status of a STR faces a civil penalty of up to the lesser of \$5,000 or three times the revenue generated. Any other violation of the administrative code or the rules will result in additional penalties, as described below in Table 1.

Table 1: Additional penalties applicable to hosts under the proposed rules

Violation Description	First Violation	First Default	Second Violation	Second Default	Third and Subsequent Violation	Third and Subsequent Default
Falsely certifying that terms of lease do not prohibit tenant from applying for a short-term rental registration or from acting as host for short-term rentals within the dwelling unit	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Failing to timely notify OSE of changes to information provided by the host in connection with a short-term rental application	\$100	\$500	\$500	\$2,500	\$1,000	\$5,000
Failing to post and maintain a diagram indicating emergency exits for the dwelling unit and the building where it is located	\$100	\$500	\$500	\$2,500	\$1,000	\$5,000
Failing to post and maintain a copy of the short-term rental registration certificate for the dwelling unit	\$100	\$500	\$500	\$2,500	\$1,000	\$5,000
Failing to include a short-term rental registration number in an advertisement or other offer for short-term rental of a dwelling unit	\$100	\$500	\$500	\$2,500	\$1,000	\$5,000
Failing to maintain a record of each short-term rental, for at least seven years after such short-term rental occurred	\$500	\$2,500	\$1,000	\$5,000	\$5,000	\$5,000
Making a false statement or concealing a material fact in connection with filing or renewing an application for short-term rental	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Operating a short-term rental in violation of other housing restrictions relating to short-term rental of dwelling units (invalid for private or Class A dwellings)	\$500	\$2,500	\$1,000	\$5,000	\$5,000	\$5,000
All other violations of Chapter 31 of Title 26 of the New York City Administrative Code and the rules	\$100	\$500	\$500	\$2,500	\$1,000	\$5,000

Source: CRA analysis based on the proposed rules.

45. The cumulative effect of these changes will be to significantly deter STRs, including STRs which have nothing to do with harms that OSE may seek to address through regulation. The changes introduce significant financial and administrative costs and introduce risks of large fines in the event of an inadvertent error by a host or a clerical error by OSE. Further, the economic literature has established how administrative barriers can have disproportionate effects. For instance, in the context of social benefits, the economic literature shows confusion regarding program rules and incentives,¹⁴ aversion to program complexity, and small “hassles” involved in claiming benefits¹⁵ are all reasons individuals do not claim benefits when they are eligible.¹⁶
46. Furthermore, the proposed rules are likely to disproportionately affect individuals providing STRs on an infrequent basis. The requirements of the proposed rules can be seen as a

¹⁴ E.g., Jeffrey B. Liebman and Richard J. Zeckhauser, “Schmeduling” (October 2004), pp. 8-10.

¹⁵ E.g., Marianne Bertrand, Sendhil Mullainathan, and Eldar Shafir, “Behavioral Economics and Marketing in Aid of Decision Making Among the Poor,” *Journal of Public Policy and Marketing*, vol. 25(1) (2006), pp. 8-23.

¹⁶ Saurabh Bhargava and Dayanand Manoli, “Psychological Frictions and the Incomplete Take-Up of Social Benefits: Evidence from an IRS Field Experiment”, *The American Economic Review*, vol. 105(11) (2015), pp. 3489-3529.

“fixed cost” that hosts will have to incur independently of the number of nights they rent their dwelling units. This fixed cost will be more burdensome on the infrequent host relative to the frequent host. This differential impact is likely to be counterproductive because STRs by infrequent hosts are the least likely to impact housing affordability. Rather, they are likely to reflect efficient and desirable activity whereby hosts are renting out spare rooms when they are available. Therefore, the proposed rules implementing Local Law 18 will crowd out infrequent hosts, losing out on the efficiencies described above.

3.4. The new requirements on booking services also appear unnecessarily burdensome

47. The proposed rules also place new obligations on booking services. These conditions are not only time-consuming but could also result in large fines to booking services for inadvertent errors. They impose costs on legitimate transactions made by hosts who could exit the market due to the new regulation.
48. Regarding financial requirements, booking services must pay a new fee of \$2.40 for each non-Class B dwelling listing verified within a calendar year. Furthermore, booking services could have to pay for the same listing more than once per year if information changes or there is a verification error.
49. Booking services would need to reverify each listing within 3 calendar months of the previous verification, within two calendar days of the expiration date contained in the unique confirmation number, and whenever it knows or should have known that any data used to complete the most recent verification has changed. Furthermore, a booking service will be presumed to know that a registration has been revoked after the OSE notifies it. These rules require the booking service to not only periodically check whether hosts are complying with the regulation, but also hold the booking service responsible for tracking changes to personal information, resulting in a continuous state of monitoring by booking services that would shift OSE’s enforcement duties to booking services.
50. Further, penalties will be imposed on booking services if they fail to submit a monthly report detailing STR transactions processed through their platforms or if they collect fees from hosts that have either not registered with the OSE or have not had their details verified by the electronic system. Booking services that collect fees from unauthorized hosts will face, for each transaction, a fine of up to the lesser of \$1,500 or three times the amount of the fee collected in connection with the challenged transaction. Civil penalties will also be imposed if booking services’ reports are missing, incomplete or inaccurate and are not corrected or justified within 15 business days.
51. The proposed rules are also likely to increase the processing time for hosts looking to rent out their dwelling units. I understand the OSE plans to design and introduce an electronic system to verify the registration of STR dwellings and their hosts. According to section 22-02 of the proposed rules, this system would:
 - a) Verify that a short-term rental is for a Class B dwelling unit; or
 - b) Verify that
 1. the dwelling unit in question is associated with the short-term rental registration number submitted by such person to the booking service,
 2. such registration is valid at the time of verification,
 3. that the uniform resource locator or listing identifier being used to offer the short-term rental is associated with the short-term rental registration number,and

4. that the host’s full legal name and physical address information provided by such person to the booking service match the information contained in the electronic verification system.
52. Overall, these additional verifications are likely to take time, thus reducing the possibility of short-notice listings, which in turn results in fewer choices for guests and lower economic benefits for hosts. Item 4 in particular is likely to present serious challenges as its proper implementation implies correctly matching names and addresses between the booking service and the electronic verification system.
53. I would anticipate technical and other types of errors related to matching names and addresses between the booking and verification services risks resulting in the exclusion of otherwise compliant hosts because a booking service will not want to take the risk of a fine if they cannot match across the datasets and may find it prohibitively costly to ensure consistency across the datasets. To show the extent of how cumbersome this last requirement would be if implemented, Table 2 presents a list of potential name and address matching failures.

Table 2: Examples of potential name and address matching failures between booking and verification services

Description	Booking service	Verification service
Empty spaces	John Smith	John Smith
Middle name abbreviations	John M. Smith	John Michael Smith
	John M Smith	John Michael Smith
Accents	John Lopez	John López
Titles	Mr. John Smith	John Smith
Changes in identity that may be reflected in one service and not the other	John Smith	Jane Smith
Street and avenue abbreviations	1 E 70th St	1 E 70th Street
Floor abbreviations	1 E 70th St, 2 nd floor	1 E 70th St, second floor
State abbreviations	1 E 70th St, New York, NY 10021	1 E 70th St, New York, New York 10021
Post code abbreviations	1 E 70th St, New York, NY 10021	1 E 70th St, New York, 10021

Source: CRA analysis.

54. Overall, the rules implementing Local Law 18 would impose very significant costs, bureaucratic burdens, and financial risks on all STRs. This includes STRs which cannot plausibly contribute to the concerns around housing affordability that might justify regulation of STRs. Experience from the prior implementation of Local Law 64 shows that this is likely to have a very significant negative impact on the number of STR listings in NYC.

55. Negative impacts on this scale could be justified only if the deterrence of desirable activity was justified by the higher probability of removing purported illegal activity. This relies on the assumptions that most STRs are illegal, that this illegal activity generates significant harm, and that no more targeted ways of achieving any goals that may justify the legislation with less burden on legitimate activity are available.
56. I now turn to exploring these questions.

4. THE PROPOSED RULES UNNECESSARILY CURTAIL STRS THAT DO NOT UNDERMINE HOUSING AFFORDABILITY

57. In designing and evaluating the effects of the proposed rules, OSE needs to consider whether they will disproportionately affect STRs that are likely to make housing in NYC more affordable and to provide additional economic benefits to the city.

4.1. STRs can increase the utilization of existing housing stock so that it is used more efficiently, thereby promoting affordability

58. If OSE is concerned with the effect of STRs on housing affordability, it needs to consider the ways in which STRs can increase housing affordability to make sure that its rules do not conflict with that goal. STRs can increase housing affordability in three ways.
59. STRs can enable the existing housing stock to be utilized more efficiently and allow housing stock that would either be un-used or used to a more limited extent to accommodate more residents. For example:
- A host with spare rooms may only need such rooms when they have guests visiting. In such a case, they can list these rooms on a STR service at their convenience but would not rent these rooms out on a long-term basis.
 - When a host, or a member of a host's household, wishes to go away for a few weeks, they may have no interest in leasing out their apartment on a long-term basis but can use STR services to list their house (or certain rooms in the house) temporarily for the period they or members of their household are away.
 - A host with a primary residence in NYC and a secondary/vacation home that he uses for a few weeks or days at a time may wish to lease out his residence when he plans to be away but, again, would not lease it out on a permanent basis.
60. Relatedly, STRs offer a form of accommodation for visitors to the city which is more scalable than traditional hotels. Because hotels need to be set up to handle demand during peak periods, they tend to be full during peak seasons and under-utilized during off-peak seasons. Thus, having tourists' demand accommodated by a mix of hotels and STRs, with hotels handling "base load" and STRs a form of "surge capacity," is going to allow the city's real estate to be used more efficiently.
61. Finally, the opportunity to lease out one's primary residence for part of a year can provide a revenue stream for existing residents who might otherwise be priced out of the market.
62. In the remainder of this Section, I report our empirical analysis that demonstrates that the use cases described above are not mere hypotheticals, but rather that a significant proportion of STRs in NYC are being used in the ways set out above which are likely to be having a benign effect on affordability in NYC. For the reasons I explained in Section 3

above, the proposed rules will disproportionately discourage these benign STRs without promoting (and perhaps even detracting from) the goal of housing affordability in the city.

4.2. A “rental break-even” analysis shows that most STRs would not otherwise be made available as LTRs

63. The STRs which might undermine housing affordability in NYC are those which, if not listed as STRs, would instead be listed as LTRs or otherwise used for permanent housing. We have conducted an analysis to determine what fraction of STR listings on Airbnb are in that category.
64. Whether the owner of a housing unit can earn more renting on a short-term basis than on a long-term basis depends critically on how many nights per year he can book on a short-term basis. For example, booking a property on a short-term basis for 300 nights a year might generate more income than would an LTR, whereas booking a property for only 20 nights a year might not. When a property listed on Airbnb receives too few bookings to generate more income than the owner could earn by renting the unit on a long-term basis, one can reasonably infer that the owner has some non-pecuniary reason for not renting on a long-term basis. If so, then preventing the owner from offering that unit on a short-term basis will not necessarily cause him to offer it on a long-term basis and therefore will not add to the supply of housing available for permanent occupancy.
65. Consider, for example, a couple with grown children who have moved away. They may wish to maintain a guest room for when their children visit, but rent out the room when they do not have visitors and, to stay within New York State law, only when they are in town. Such a STR offering is legal. Preventing the couple from offering STRs is unlikely to cause them to rent the room out on a permanent basis and therefore will do nothing to increase the supply of permanent housing or reduce market rents for permanent housing. Indeed, it may well do the opposite.
66. Based on this logic, we have undertaken an empirical analysis to gauge what fraction of units offered on Airbnb in NYC receive too few bookings to generate as much income as the owners could earn by renting on a long-term basis. Our approach is as follows:
 1. We gathered data for the years 2017-2022 at the borough and city level for NYC.
 2. For each non-Class B Airbnb listing, we estimated the rental income they could generate based on operating as a STR. This is estimated as total host earnings divided by the number of nights booked, separately for each ZIP code in a given year.^{17 18}

17 Observations with negative revenues were excluded, which means the results presented below are conservative.

18 To the extent that people who receive bookings for a relatively small fraction of nights do so during periods of peak demand, when they can command a relatively high price, this procedure overstates what they could earn by renting more nights and therefore understates how much more they could earn by renting on a long-term basis.

3. For each of these listings, we then estimated the rental income they could generate based on an LTR model by estimating the average long-term rents using the Zillow Rent Index.¹⁹ We calculated this as the sum of monthly rents in a given year divided by the number of days in a year, separately for each ZIP code.
 4. We then calculated the break-even number of nights required for the STR model to generate more rental revenue than the LTR model.
 5. Finally, we consider the proportion of non-Class B STRs which are operating with a number of nights above the break-even level. For those who are operating as STRs despite being below the break-even level, it is reasonable to assume that there must be other factors stopping them from making their home available on an LTR basis.
67. Table 3 reports the results for the number of nights a STR host would have had to book on a short-term basis to generate as much revenue as he could have generated by renting on a long-term basis. As it shows, in 2017, a host would have had to book his property 174 nights to earn more from renting short-term rather than long-term. That figure grew to 193 in 2021.

Table 3: Average number of break-even nights in NYC by year, 2017-2022

Measure	2017	2018	2019	2020	2021
Break-even number of nights	174	182	188	215	193

Source: CRA analysis of Airbnb, Zillow, and ACS data. Note: For Queens within New York, the observations with the Zillow Rent Index smaller than the 5th percentile and larger than the 95th percentile were excluded from the analysis.

68. As the rental income within NYC varies between the different boroughs, Appendix B presents separate results for each NYC borough. The highest number of break-even nights is in the borough of Manhattan in 2021, where the number of break-even nights was 273.
69. **How many Airbnb listings are booked more than the break-even level?** We then compute the share of non-Class B listings that are booked more than the break-even number of nights. The analysis is conducted using both the ZIP-code level break-even number of nights and the total NYC break-even number of nights. The results are presented in the Table 4 below. Using the ZIP-code break-even number of nights, at most 11% of listings are actually booked for more than the break-even number of nights. Replicating the analysis using the NYC average break-even number of nights does not change the results significantly. At most, 14% of non-Class B listings are booked more than the break-even number of nights.

¹⁹ The index is constructed using Zillow's Rent estimates which are monthly estimated rental prices for properties accounting for changes in the quality of the available housing stock, generated via a hedonic model trained with public property data and rental listing information. Coles et al. (2017) also rely on Zillow data to compare short-term and long-term rental incomes. For more information on the model, see <https://www.zillow.com/research/a-peek-inside-our-newest-zestimate-the-rent-zestimate-1076/>. The analysis also uses population estimates at ZIP code level which are obtained from the American Community Survey (ACS). For more information, see <https://www.census.gov/programs-surveys/acs/data.html>

Table 4: Share of listings booked more than break-even number of nights, 2017-2021

Year	Share of listings booked more than break-even nights	
	ZIP-Code Level Number of Nights	NYC Overall Number of Nights
2017	8%	11%
2018	10%	13%
2019	10%	13%
2020	2%	3%
2021	11%	14%
Total	8%	11%

Source: CRA analysis of Airbnb, Zillow, and ACS data.

70. It is possible that hosts had hoped to book more and simply did not get as many bookings as they had anticipated. To test that hypothesis, we examine the fraction of listings that are listed for enough nights to have earned more revenue than would have been available from LTRs even if, implausibly, they booked 100% of the nights they were listed. The results are shown in Table 5 below. Using the ZIP-code level number of nights, at most 16% of listings were available more than the break-even number of nights and using the NYC overall number of nights, at most 19% of listings were available more than the break-even number of nights. This indeed shows that preventing STRs is unlikely to increase the LTR housing supply.

Table 5: Share of listings available more than break-even number of nights, 2017-2021

Year	Share of listings available more than break-even nights	
	ZIP-Code Level Number of Nights	NYC Overall Number of Nights
2017	15%	19%
2018	16%	19%
2019	16%	19%
2020	11%	16%
2021	15%	19%
Total	15%	19%

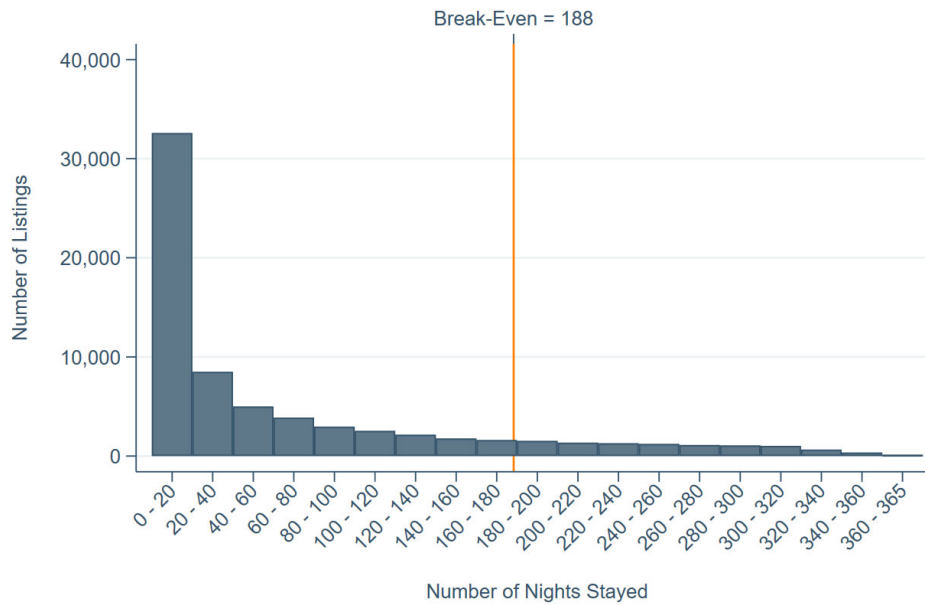
Source: CRA analysis of Airbnb, Zillow, and ACS data.

71. **What is the distribution of Airbnb listings compared to the break-even level?** To explore these results further, Figure 4 and Figure 5 below show the distribution of the number of listings by the number of nights stayed for 2019 and 2021. The NYC overall number of break-even nights is used below as it has resulted in more conservative estimates.

72. Two observations arise from this chart:

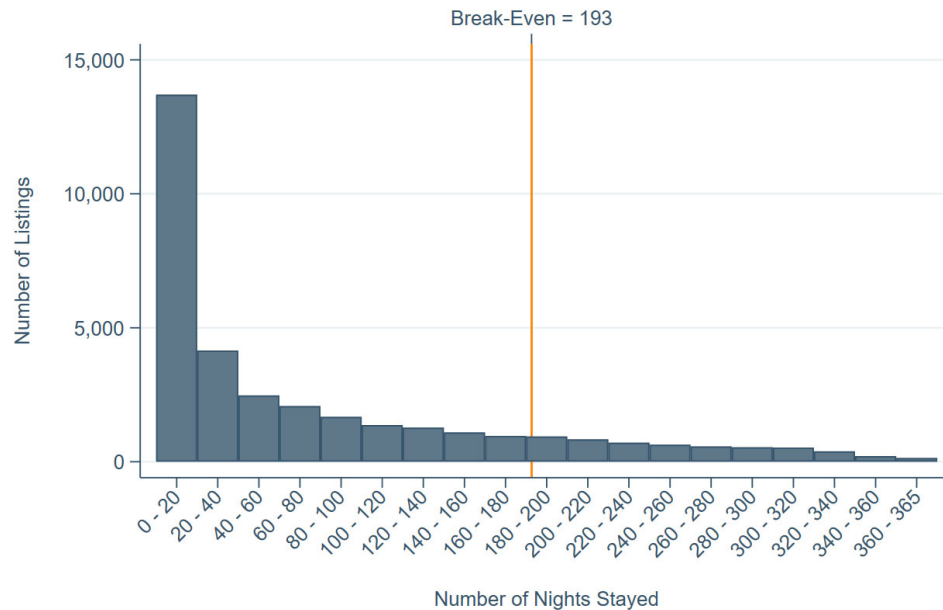
- Many STR listings generate booking volumes substantially below the break-even level. This indicates that there is a significant volume of listings which are only made available as STRs because of the flexibility that the STR model provides. Deterring such listings, as is likely to occur under the proposed rules, would prevent beneficial transactions with no realistic possibility of creating an improvement in housing supply or affordability.
- Comparing 2019 and 2021 data shows that there was a significant reduction in the number of listings made available for short periods of time. This is consistent with the data sharing requirements deterring hosts who offer their STRs only infrequently.

Figure 4: Distribution of number of listings by number of nights stayed in NYC, 2019



Source: CRA analysis of Airbnb, Zillow, and ACS data.

Figure 5: Distribution of number of listings by number of nights stayed in NYC, 2021



Source: CRA analysis of Airbnb, Zillow, and ACS data.

73. My analysis above is consistent with a number of similar studies. A 2018 report by the Bay Area Council Economic Institute²⁰ (BACEI) calculates whether converting a housing unit (whether a single bedroom or an entire apartment) to short-term, rather than long-term use, can be economical. For example, the report considers the market for single bedrooms and finds that *“the long-term rental market for single bedrooms [in San Francisco] would be far more lucrative than the less certain income from homesharing. Therefore, there are no economic incentives to convert bedrooms into short-term rentals.”*²¹ Considering the market for entire home rentals, the report similarly finds that conversion to STR is uneconomical, especially given the relative uncertainty of STR income when compared with the monthly rent payments from a long-term tenant.²²
74. A recent report on STRs in Boston similarly found that *“an owner could potentially make an average of \$1,052 more monthly rent[ing] a unit as a long-term rather than a short-term rental. An owner would likely lose money renting a unit as a short-term rental in nearly every neighborhood.”*²³ Coles et al. (2017), who study New York City, similarly found that *“to match long-term rental revenue, [STR] hosts would have to have their homes booked over*

²⁰ Bay Area Council Economic Institute, “Home-sharing in San Francisco: A Review of Policy Changes and Their Impacts” (January 2018), p. 5.

²¹ Ibid., p. 5.

²² Ibid., p. 6 (“Our analysis of 16 San Francisco neighborhoods shows that hosts would need to share their unit on the short-term rental market for 319 days in Bernal Heights at the high end and 160 days in the Marina at the low end to justify a short-term rental over a long-term lease.”).

²³ Mayor’s Office of Housing, “Short-Term Rentals 2022 Report to the Boston City Council” (June 29, 2022), p. 9.

216 days a year.”²⁴ It is worth noting that the authors control for differing bedroom compositions between Airbnb listings and those on the long-term rental market. Coles et al. (2017) find that the median number of nights booked (46) on Airbnb is much lower than the number of break-even nights (216). This substantial difference between the median and break-even number of nights indicates that controlling for this aspect would not change the results presented here.

75. While the results in these studies are generally consistent with our findings, our interpretation is more nuanced than the published studies. Those studies suggest that converting permanent housing to STRs is generally unprofitable. Since, however, some New York property owners have dedicated STRs that could be permanent housing, the market evidence is that it can be profitable to divert some permanent housing to STRs. Our results show that some properties listed on Airbnb do generate more revenue from STRs than would be available from renting to a permanent resident. But, while that is true for some listings on Airbnb, our results suggest that it is not true for the vast majority of Airbnb listings.

4.3. STRs can alleviate housing affordability issues for some residents

76. To assess the extent to which STRs generate a revenue stream for hosts which might alleviate affordability issues, we have used Airbnb data to calculate revenues paid out to hosts in NYC in 2019 and 2022. Table 6 shows that the median Airbnb host of a non-Class B dwelling in New York earned almost \$5,000 in 2021.

Table 6: Median Airbnb host annual earnings, 2017-2021

	2017	2018	2019	2020	2021
New York City	1,901	2,497	3,350	417	4,896

Source: CRA analysis of Airbnb listing data.

77. If we focus only on hosts whose booking levels were below the break-even level discussed in the previous sub-section, we find that such hosts received earnings of around \$210 million in 2021, which corresponds to around \$2,500 per annum for the median host in this category. This is money earned by New Yorkers in relation to STRs which cannot realistically be having any negative effect on housing affordability and would likely be largely eliminated by the proposed rules.

²⁴ Peter A. Coles, Michael Egesdal, Ingrid Gould Ellen, Xiaodi Li, and Arun Sundararajan, “Airbnb Usage Across New York City Neighborhoods: Geographic Patterns and Regulatory Implications” (October 12, 2017), p. 12, reprinted in *The Cambridge Handbook of the Law of the Sharing Economy* (Davidson, N.M., le Finck, M. & Infranca, J.J., eds.) (2018).

Table 7: Total host pay-out from non-Class B listings with number of nights booked below break-even level, 2017-2021

Year	Median Host Pay-out from Listings Below Breakeven Level of Nights Stayed (in \$)	Total Host Pay-out from Listings Below Breakeven Level of Nights Stayed (in \$M)
2017	1,019	272.59
2018	1,261	300.78
2019	1,610	340.83
2020	264	111.89
2021	2,452	210.16

Source: CRA analysis of Airbnb data.

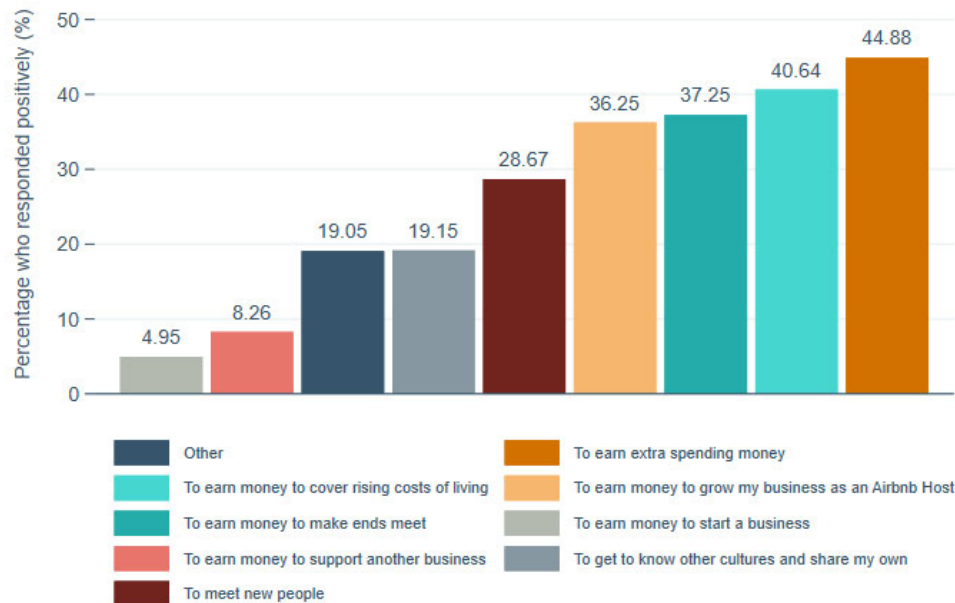
78. Survey evidence also supports that hosts can put STR revenues they generate to use towards rent or mortgage repayments. According to a survey performed by Airbnb in 2021, hosts report using 46% of their total income on paying rent or mortgages. This percentage includes Airbnb earnings, and I use it as a benchmark to calculate what share of income rent payments would represent in the absence of Airbnb earnings. It should be noted that the survey of NYC Airbnb hosts has a very low number of respondents and therefore the estimates calculated in this Section should be interpreted with caution. Using data on individual rental payments from Zillow (2022),²⁵ I can estimate the average annual rent paid by New Yorkers. I calculate the city's average annual income to be equal to the average annual rent divided by 0.46.²⁶
79. Excluding the average earnings generated from renting non-Class B dwellings on Airbnb as part of the hosts' income increases the share of rent to income by 9 percentage points to 55%. These estimates are in line with those calculated by Bloomberg (2022), which reports a share of rent to income equal to 43% in Queens, 55% in Manhattan and 60% in Brooklyn.²⁷
80. A 2021 host survey that Airbnb conducted states that hosting contributes to covering the rising costs of living for 41% of the hosts across the country, while 37% admit that Airbnb helps them make ends meet. Thus, the presence of Airbnb significantly contributes to reducing the financial constraints of hosts.

²⁵ See "Housing Data," Zillow Research (November 2022), <https://www.zillow.com/research/data/>.

²⁶ I obtain non-Airbnb income by subtracting from the estimated total annual income the average pay-out for hosts.

²⁷ See Jennifer Epstein, "NYC Renters 'Squeezed to Their Limit' With Record-High Costs," *Bloomberg* (July 6, 2022), <https://www.bloomberg.com/graphics/property-prices/nyc/>.

Figure 6: Reasons cited by hosts for hosting on Airbnb, 2021



Source: Airbnb survey on hosts in United States (2021).

81. The 2018 BACEI report notes that San Francisco’s cap of 90 days of un-hosted STR per year²⁸ is already stricter than necessary.²⁹ It is therefore likely that current regulations already prevent some hosts in San Francisco from listing their apartment for additional nights and earning additional revenue. An analysis of proposals for further tightening of regulations quantified the number of adversely affected hosts and the degree to which their overall income would fall: “The most restrictive cap analyzed—at 60 days regardless if the unit is hosted or un-hosted—would impact 2,341 San Francisco households and displace revenue of over \$14 million each year compared to existing regulations. A cap of 80 days still has effects on 1,452 households that would lose over \$8 million in revenue in aggregate.”³⁰ The report concludes, “the strictest regulations on home-sharing would actually create more affordability issues as local income is lost.”³¹

4.4. The flexibility of STRs can also benefit New Yorkers as well as visitors to the city

82. Another channel through which STRs benefit city residents is through those residents’ own use of STRs. Some STRs increase housing affordability for residents because they are utilized by New Yorkers. For city residents who are in need of a temporary place to stay,

28 San Francisco allows registered hosts who qualify as permanent residents to have “un-hosted rentals,” effectively whole-unit rentals, for a maximum of 90 days in a calendar year. See “FAQs on short-term rentals,” available at <https://sfplanning.org/str/faqs-short-term-rentals> (last accessed on October 31, 2022).

29 See Bay Area Council Economic Institute, “Home-sharing in San Francisco: A Review of Policy Changes and Their Impacts” (January 2018), p. 5. In economics jargon, San Francisco’s 90-day cap is a “binding constraint.”

30 Ibid., p. 7.

31 Ibid., p. 4.

STRs on Airbnb provide a more affordable and convenient alternative to hotels as they are located in more residential areas. For instance, in the case of home renovations or gaps between LTRs, NYC residents benefit from the availability of STR listings on Airbnb. 85,300 of non-Class B STR bookings in the last twelve months in NYC were made by guests from New York City.

83. Curtailing these STRs on Airbnb would have a negative impact on these residents who might in turn have to stay at hotels, which are primarily concentrated in the traditional tourist districts and have higher average daily rates.

5. THE PROPOSED RULES ARE LIKELY TO HARM THE OVERALL TOURISM ECONOMY

84. I now consider the next key part of the analysis of whether the proposed rules are in the public interest – the impact of STRs on the tourist economy. It is important to consider this issue holistically, taking account of the tourism industry in its entirety, not just the hotel sector which has a clear financial incentive to face reduced competition from STRs.

5.1. Tourism is a key industry for the NYC economy

85. Tourism supports more than 283,200 jobs in NYC, according to New York’s Office of the State Comptroller (OSC). NYC hosted 66.6 million visitors in 2019, generating \$47.4 billion in spending.³²
86. The same study also reported that the tourism sector accounts for 7.2% of private sector employment and 4.5% of wages.³³ Even with the impact of the COVID-19 pandemic, tourism generated \$5.3 billion in tax revenues for NYC in FY 2020, representing 8.3% of total tax collections.³⁴

5.2. Restricting STRs has negative impacts on the tourism sector

87. The restriction of STRs would have a detrimental consequence on the affordability of lodging for tourists because STRs assist with providing accommodation capacity at times of peak demand. By doing so they make travelling to NYC more affordable. This increases tourism footfall which will then drive expenditure.

32 See Office of the New York State Comptroller, “The Tourism Industry in New York City: Reigniting the Return” (April 2021), p. 2, <https://www.osc.state.ny.us/reports/osdc/tourism-industry-new-york-city>.

33 Ibid., p. 5.

34 Ibid., p. 14.

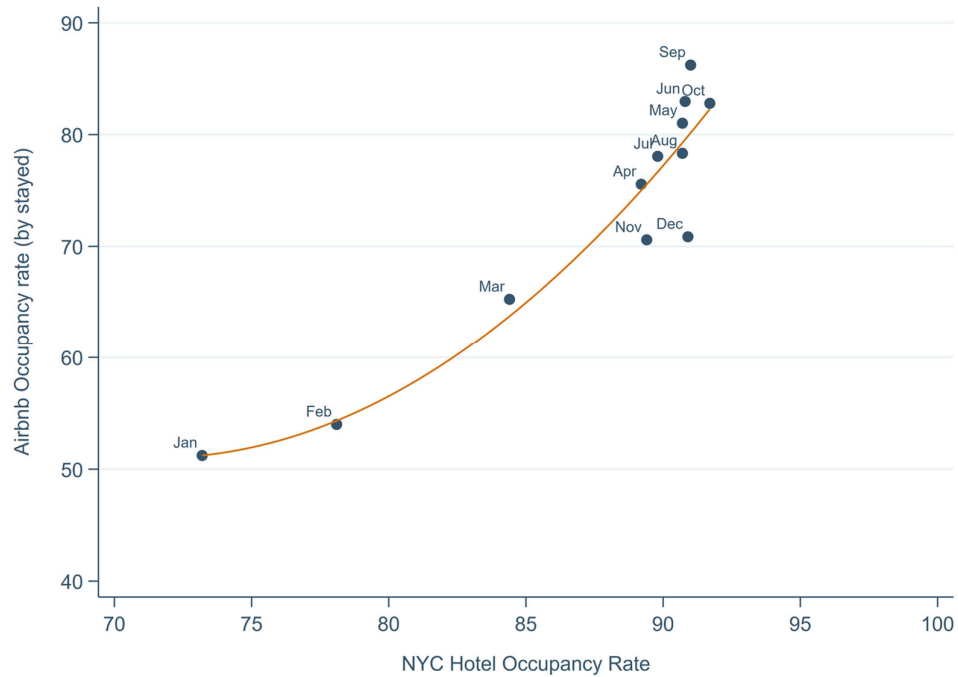
88. To make this point concrete I have analyzed data from Airbnb and from the public domain. The Figure below is a scatter plot of monthly hotel occupancy rates³⁵ in NYC in 2019³⁶ on the horizontal axis and Airbnb occupancy rates on the vertical axis. One can see that NYC hotels have substantial excess capacity in January, February, and March. For the rest of the year, occupancy rates range from 90%-95%, with the peak being in September and October. Occupancy rates of 90% or above are, in effect, full capacity utilization. Thus, the data indicate that, for much of the year, there is a cap on the number of hotel rooms available for visitors.
89. Figure 7 shows that the relationship between hotel occupancy and Airbnb occupancy is not a straight line, but instead curves upward.³⁷ The shape of the relationship demonstrates that STRs provide “surge capacity” to meet periods of peak demand. Not only are Airbnb occupancy rates high when hotel occupancy rates are high, they are disproportionately higher in these periods of peak demand.
90. To see this, compare the points for May, June, August, September, and October. The hotel occupancy ranges from 90% to 92%. In effect, the hotels were full. Over those same months, the Airbnb occupancy rates fluctuated between 78% and 86%. The lower rates of Airbnb occupancy compared with hotels indicate that STRs are a source of surge capacity, and the disproportionately high rate of utilization in, for example, September and October, indicates that visitors to NYC find STRs to be an alternative when the hotels are full.

35 The Hotel occupancy rates are obtained from the third-party source NYC & Company (which aggregates data primarily from PKF Consulting Monthly Trends in the Hotel Industry Reports and STR) which obtained the estimates by dividing the total number of hotel rooms sold by the total inventory of hotel rooms monthly. I adopt a similar methodology to calculate the Airbnb occupancy rates. The total number of nights booked across all Airbnb properties is divided by total number of nights Airbnb properties were available for booking in a month to obtain this measure.

36 We report 2019 because it was the last year before the COVID-19 pandemic. The graphs for 2018 and 2017 show a virtually identical pattern.

37 In mathematical terms, the curve I have fit to the data is a parabola, which fits the data significantly better than a straight line.

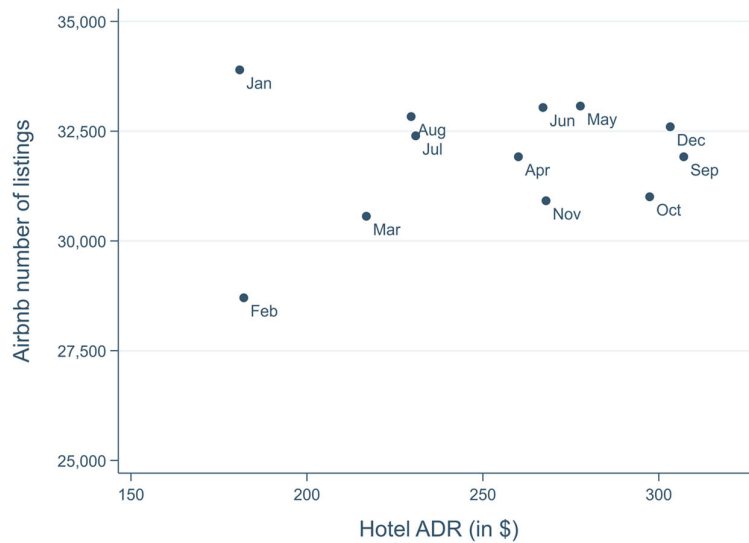
Figure 7: Hotel and Airbnb 2019 monthly occupancy rates



Source: CRA analysis of Airbnb data and data from NYC & Company.

91. The Figure below illustrates that the number of Airbnb listings increases when Hotel Average Daily Rates (ADRs) increase. Specially, in 2019, the number of listings increases by around 4,000 when Hotel ADR increases from around \$180 to \$300 between February and December.

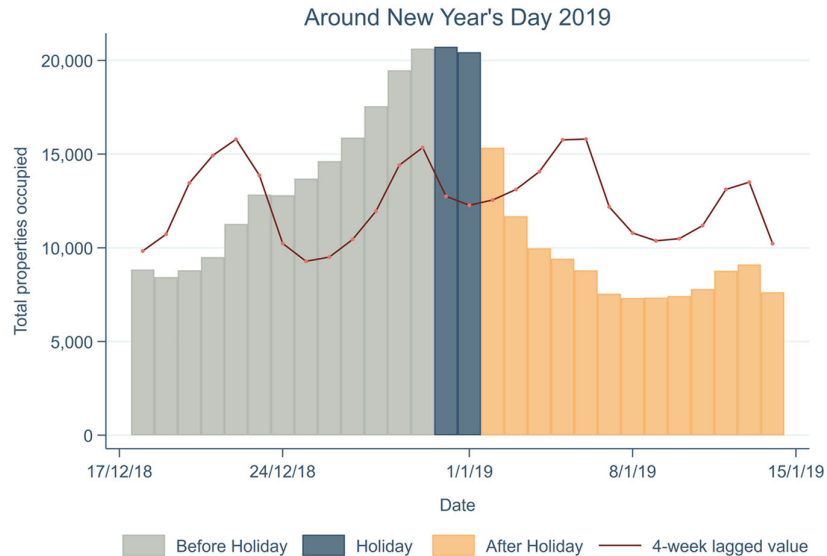
Figure 8: Number of Airbnb listings vs. Hotel Average Daily Rates (ADRs), monthly 2019



Source: CRA analysis of Airbnb data.

92. To provide a further illustration of this dynamic, Figure 9 below shows data on Airbnb bookings around New Year’s Eve 2018/New Year’s Day 2019. There were about 20,000 Airbnb bookings for New Year’s Eve, compared with fewer than 10,000 both two weeks before and two weeks afterward. Given that hotels were likely completely full around New Year’s, the 20,000 STRs were booked by people who could not have otherwise found housing in NYC to celebrate New Year’s Eve, consequently reducing the amount of tourism expenditure in New York City during that holiday.

Figure 9: Surge in demand around federal holidays, 2019



Source: CRA analysis of Airbnb data.

5.3. The non-hotel sector accounts for the vast majority of the tourism economy

93. When considering the net effects of STRs on tourism it is important to recognize that the bulk of tourism activity is not concentrated on lodging or hotels. Table 8 presents the same data as a table reported by the New York State Comptroller³⁸ and shows that 72% of tourist spending is on categories other than lodgings.

94. While limitations on STRs that restrict tourist traffic may help hotels, they hurt restaurants, retailers, theatres, museums, and taxi drivers. And it is not just the businesses that would be harmed; workers at these businesses would be as well.³⁹

³⁸ Office of the New York State Comptroller, “The Tourism Industry in New York City: Reigniting the Return” (April 2021), p. 5, <https://www.osc.state.ny.us/reports/osdc/tourism-industry-new-york-city>.

³⁹ When hotels are full, it is not clear that hotel workers benefit from the surge pricing that occurs in periods of peak demand. However, restaurant workers, actors, and retail employees would benefit from the increased business their employers receive when the number of tourists increases.

Table 8: Visitor spending by category, 2019

Spending Category	Visitor Spending (billions)	Share of Total
Lodging	\$13.5	28%
Food and Beverage	\$10.5	22%
Retail	\$9.3	19%
Arts, Culture & Entertainment	\$5.6	12%
Local Transportation	\$8.5	18%
Miscellaneous	\$0.5	1%
Total	\$47.9	100%

Note: The total is higher than the \$47.4 billion reported due to rounding.

Source: NYC & Company; OSC analysis.

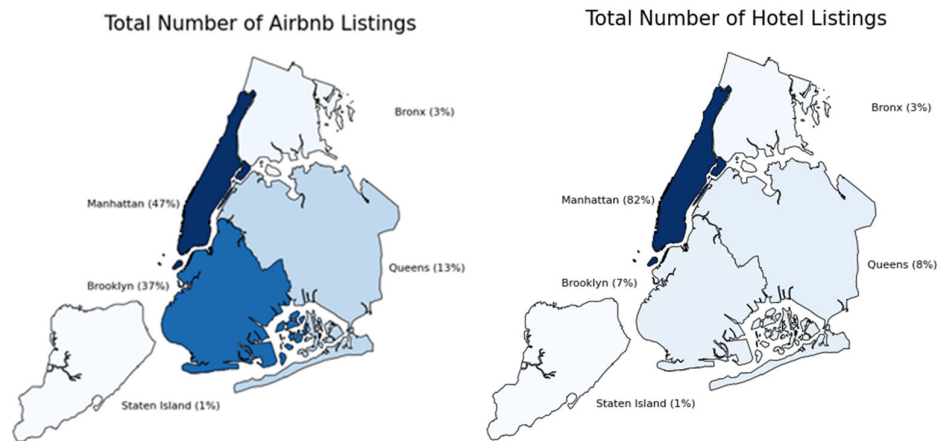
95. This conclusion is consistent with the academic literature which finds that STRs can have a positive impact on retail establishments, particularly those popular amongst tourists. Xu and Xu (2021) find that “a one-percent increase in Airbnb listings raised the ... value of retail renovation investment by 3.691 percent in the following quarter. Meanwhile, the net growth of liquor, retail food, and entertainment business licenses increased by 2.067, 3.933, and 0.755, respectively.”⁴⁰

5.4. STRs promote tourism outside of traditional tourist districts and restricting them would harm these areas

96. The geographic distribution of all Airbnbs across New York City is more evenly spread out than the distribution of hotels in the city. Figure 10 shows the proportion of Airbnbs (left panel) as well as hotel listings (right panel) by borough in New York City. The darker color represents a higher concentration of Airbnbs or Hotels, respectively, in a borough relative to the rest of New York City.
97. Of all the hotels in the city, an outright majority of them are in Manhattan. In contrast, only under half the total Airbnb listings are situated in Manhattan while the boroughs of Brooklyn and Queens house a significant share of Airbnb listings at 37% and 13% respectively.

⁴⁰ Minhong Xu and Yilan Xu, “What happens when Airbnb comes to the neighborhood: The impact of home-sharing on neighborhood investment,” *Regional Science and Urban Economics*, vol. 88 (2021), p. 1.

Figure 10: Geographic distribution of hotel and Airbnb listings



Source: CRA analysis of Airbnb data (2019) and data on hotel locations from data.cityofnewyork.us (January 2020). Figures may not sum to 100% due to rounding. Includes both active and inactive listings.

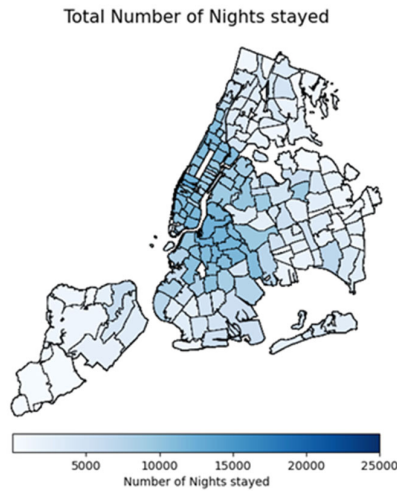
98. While providing a wider breadth of choice in terms of location of lodging to visitors, the more dispersed nature of Airbnb listings also assists in promoting tourism-related economic activities throughout the city. Visitors are likely to spend money on local vendors within the food & beverages, retail, and recreational industries, which are often determined by proximity to a tourist's lodging location. There are 60,800 firms in the city which provide a service in support of tourism, directly or indirectly. Of these, 25.3% and 22.5% are in Brooklyn and Queens, respectively.⁴¹ The existence of a significant share of Airbnbs in these boroughs, given that the share of hotels in these regions is relatively lower, must contribute positively to tourism-related activities located in Brooklyn and Queens.
99. The distribution of employment by the tourism sector in different boroughs of the city reveals that more than 40% of such jobs are outside Manhattan. For instance, Queens has 24% of the tourism employment in the city.⁴² Queens is also the most dependent on tourism, as 14% of all labor income generated in the borough was attributable to this sector.⁴³ This validates the need for lodging in boroughs outside of Manhattan to complement their respective tourism sectors. Relatedly, boroughs outside of Manhattan appeal to visitors as well, as supported by their popularity amongst Airbnb guests in Figure 11.

41 See Office of the New York State Comptroller, "The Tourism Industry in New York City: Reigniting the Return" (April 2021), p. 8, <https://www.osc.state.ny.us/reports/osdc/tourism-industry-new-york-city>.

42 Ibid., p. 6.

43 See Tourism Economics, "Economic Impact of Visitors in New York 2019" (2019), p. 40, <https://esd.ny.gov/sites/default/files/NYC-2019-NYS-Tourism-Economic-Impact.pdf>.

Figure 11: Number of nights stayed at Airbnb listings is also geographically spread out (2019)



Source: CRA analysis of Airbnb data.

5.5. The risks to tourism jobs are likely to disproportionately impact low-income individuals and minorities

100. As reported by the OSC, workers in the tourism industry earn lower wages than the city's work force. More specifically, the median annual wage in this industry during 2019 was equal to \$32,000, far lower than the overall median for the city, which was \$50,000.⁴⁴ Table 9 presents the average annual wage of the sector by occupation. While these figures are partially explained by the fact that almost one-third of employees in this sector work part-time, it is also the case that a higher number of tourism-related workers do not have a bachelor's degree (60%), compared to the city's total workforce (48%). For the occupations shown in Table 9, the "Other Managers" category is the only one that requires a bachelor's degree for entry.
101. Furthermore, almost two-thirds (66%) of tourism employment are composed of minorities, a higher share than the city's average (61%): 27% are Latino or Hispanic, 18% are Black or African American and 17% are Asian. Additionally, immigrants represent 46% of the tourism industry, a larger share than in the total work force in New York City (41%).⁴⁵

44 See Office of the New York State Comptroller, "The Tourism Industry in New York City: Reigniting the Return" (April 2021), p. 7, <https://www.osc.state.ny.us/reports/osdc/tourism-industry-new-york-city>.

45 Ibid.

Table 9: Top 15 occupations in tourism, 2019

Occupation	Share of Sector	Average Wage
Taxi Drivers	7.8%	\$19,600
Cashiers	4.5%	\$23,200
Maids and Housekeeping Cleaners	4.3%	\$42,700
Waiters and Waitresses	3.3%	\$29,300
Retail Salespersons	3.2%	\$39,200
Other Managers	3.1%	\$76,400
First-Line Supervisors of Retail Sales Workers	2.7%	\$53,800
Janitors and Building Cleaners	2.6%	\$34,100
Customer Service Representatives	2.5%	\$36,000
Cooks	2.5%	\$28,300
Exercise Trainers and Group Fitness Instructors	2%	\$51,800
Driver/Sales Workers and Truck Drivers	1.9%	\$32,500
Flight Attendants	1.8%	\$50,500
Chefs and Head Cooks	1.5%	\$38,500
Food Preparation Workers	1.5%	\$25,400
Subtotal	45.2%	\$36,500

Source: US Census Bureau, American Community Survey, 2019 1-year survey; OSC analysis.

5.6. If the hotel sector grows to accommodate tourists displaced from STRs, this could reduce housing availability

102. Because capacity utilization of hotels varies throughout the year, a significant amount of hotel capacity is idle at times during the year, particularly from January to March. Restricting STRs would allow hotels to charge higher rates during peak demand, which would in turn provide an incentive to increase hotel capacity. While hotels would be able to fill the additional capacity during peak demand, the additional capacity would tend to lie idle during off-peak periods. The result would be inherently inefficient use of scarce land. The land used for the additional hotel capacity could otherwise be used to increase the quantity, and thereby reduce the cost, of permanent housing. In other words, overly aggressive enforcement against STRs can work against the underlying objective of increasing housing affordability in New York.
103. The Internet Association's report assesses the impact of hotel development on residential space using publicly available data. This report revealed that between 2010 and 2016, hotel development resulted in a loss of 750,000 square feet of pre-existing residential space

(approximately 773 residential units).⁴⁶ Hotel rooms outpaced the growth in residential units in that period. At a time of rising rental and housing prices where average rents have increased between 10-25% year-on-year in 2022,⁴⁷ across all boroughs of New York City, a squeeze on available land for housing projects will have a substantial negative impact on affordability of housing.

104. Further, the literature establishes that STRs can actually improve existing housing stock. For instance, Xu and Xu (2021) find the following effect on residential renovation projects: “a one-percent increase in Airbnb listings raised the number of residential renovation projects by 0.527 percent”.⁴⁸ Further, Bekkerman et al. (2021) study 15 US cities and find that “a 1% increase in Airbnb listings led to a 0.769% increase in [building] permit applications,” suggesting that Airbnb can play a major role in supporting local real estate markets and thus boosting local tax bases. Given these findings, it follows that restricting STRs can have a significant, negative impact on local economic activity.⁴⁹
105. Recent legislation has focused on easing restrictions which would assist developers to convert vacant and under-utilized NYC hotels into housing for the homeless.⁵⁰ This highlights the need for housing availability, especially to address the issue of homelessness in the city. Additionally, when developers attempt to undertake this responsibility, they lose out in bidding wars to real-estate firms which aim to convert these buildings into apartments. This demonstrates the existence of housing demand both to address the issue of homelessness and to provide residents with greater housing availability. Hence, building additional hotels at a time where under-utilized hotels are being converted to supply affordable housing for local residents seems counter-productive.

6. CONCLUSION

106. My assessment is that the proposed rules are not economically justified. Even if one assumes that the proposed rules are intended to prevent STRs from reducing the supply of permanent housing, the proposed rules are poorly targeted and disproportionate. They will unnecessarily prevent STRs that are beneficial for the city and cannot have the effect of reducing housing affordability. Indeed, my analysis has shown that many of the STRs impacted by the law may improve housing affordability by allowing the existing housing stock to be used more efficiently and by generating a stream of income for city residents. Further, I have explained how undermining STRs would curtail an important source of

46 Internet Association, “Hotel Development Is Eating Up Residential Space in New York City,” p. 7, https://kipdf.com/hotel-development-is-eating-up-residential-space-in-new-york-city_5afa04977f8b9a6e148b45eb.html.

47 See Elliman Report, “Manhattan, Brooklyn and Queens Rentals” (June 2022), https://millersamuel.com/files/2022/07/Rental_06_2022.pdf?updated.

48 Minhong Xu and Yilan Xu, “What happens when Airbnb comes to the neighborhood: The impact of home-sharing on neighborhood investment”, *Regional Science and Urban Economics*, vol. 88 (2021), p. 1.

49 Ron Bekkerman, Maxime C. Cohen, Edward Kung, John Maiden, and Davide Prosperio, “Restricting Airbnb Rentals Reduces Development,” *Harvard Business Review* (November 2021), <https://hbr.org/2021/11/research-restricting-airbnb-rentals-reduces-development>.

50 The [Hotel Conversion Bill](#) signed into law on June 7, 2022 allows hotels which are authorized as Class B multiple dwellings to rent rooms for permanent residence purposes.

“surge capacity” to accommodate visitors to the city at times of peak demand and, by doing so, would likely harm the tourism sector.

APPENDIX A: BIOGRAPHICAL NOTES AND CV

A.1 Biographical notes

Professor Michael Salinger

107. Professor Michael Salinger is the Jacqueline J. and Arthur S. Bahr Professor of Management and Professor of Economics at the Boston University Questrom School of Business. From 2005 to 2007, he was Director of the Bureau of Economics at the FTC. He is widely recognized internationally as an expert on the economics of competition and competition policy. He has consulted for private organizations and a variety of worldwide government agencies, including the EPA, the Federal Trade Commission, the Board of Governors of the Federal Reserve, and the Australian Competition and Consumer Commission. He has a large body of published research on competition policy, particularly on issues such as the structural determinants of market power, the statistical properties of firm growth, and the competitive effects of tying and vertical mergers. He has also served on the editorial boards of the *Review of Industrial Organization* and the *Journal of Industrial Economics*.
108. While at the FTC, a key part of his remit was to advocate for pro-competitive regulation and against reforms to local laws and regulations which special interests had the influence to get passed but which, in the FTC's view, were not in the public interest.

Dr. Oliver Latham

109. Dr. Latham is a Vice President in the competition practice at Charles River Associates. He holds a PhD in Economics from the University of Cambridge and has worked on multiple assignments in digital industries and platform markets, including work for Uber, Amazon, Yelp, Microsoft, PayPal and others. He has published articles in refereed journals on the economics of media and digital markets and has also advised the UK telecoms regulator Ofcom on policy issues around digital platforms.

Muath Masri

110. Mr. Masri is a Principal in the competition practice of Charles River Associates. He holds an MPhil in Economic Research from the University of Cambridge and has worked on multiple regulatory cases involving digital platforms.

Other CRA economists

111. Other members of the CRA team included Eyal Dvir, Mariana Racimo, Areen Dakessian and Shreyas Guntur.

A.2 Professor Michael Salinger's CV

MICHAEL A. SALINGER

Senior Academic Adviser

PhD, Economics
Massachusetts Institute of
Technology

BA, Economics
Yale University

Dr. Michael A. Salinger is a senior academic adviser with the Competition Practice of CRA. He is Jacqueline J. and Arthur S. Bahr Professor of Management and Professor of Economics at the Boston University Questrom School of Business. From 2005 to 2007, he was Director of the Bureau of Economics at the FTC. He has published articles on such issues as the structural determinants of market power, the statistical properties of firm growth, and the competitive effects of tying and vertical mergers and has served on the editorial boards of the *Review of Industrial Organization* and the *Journal of Industrial Economics*. Prior to joining CRA, he was a managing director in LECCG's Cambridge office.

PROFESSIONAL HISTORY

2011–Present	<i>Senior Academic Adviser</i> , Charles River Associates
2007–2011	<i>Managing Director</i> , LECCG
1990–Present	<i>Jacqueline J. and Arthur S. Bahr Professor in Management</i> (2011–Present) <i>Professor of Economics</i> (2001–Present) <i>Chairman of Markets, Public Policy and Law Department</i> (2018–Present) <i>W. Everett Lord Distinguished Faculty Scholar</i> (2007–2011) <i>Associate Professor</i> (1990–2001) <i>Chairman of Finance and Economics Department</i> (2000–2004) <i>Faculty Director of Undergraduate Program</i> (1999–2000) Boston University Questrom School of Business
2005–2007	<i>Director</i> , Bureau of Economics, US Federal Trade Commission (while on leave from Boston University)
1997–1998	<i>Visiting Associate Professor of Applied Economics</i> , Sloan School of Management, MIT (while on leave from Boston University)
1982–1990	<i>Associate Professor of Business Economics</i> (1987–1990) Assistant Professor (1982–1987) Columbia University Graduate School of Business
1985–1986	<i>Economist</i> , Bureau of Economics, Antitrust Division, United States Federal Trade Commission (while on leave from Columbia)

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"Concluding Remarks for Energy Markets in the 21st Century: Competition Policy in Perspective," Washington, DC, April 12, 2007.

"Prepared Remarks on the Relationship between Antitrust and Regulation and on the Effects-Based Analysis," Presented before the Jevons Society, University College of London, United Kingdom, February 21, 2007.

"The Legacy of Matsushita: Has this Thing Called Economics Gotten Way Out of Hand?" Presented at Matsushita at 20, Loyola University School of Law, Institute for Consumer Antitrust Studies, Chicago, September 29, 2006.

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"Consumer Protection Economics at the FTC," Prepared remarks for the Chief Economist Roundtable at the International Industrial Organization Conference, Boston, MA, April 8, 2006.

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"Moneyball and Price Gouging," Boston Bar Association Antitrust Committee, Boston, MA, February 27, 2006.

"Can Economics Bridge the Atlantic? Monopolization Under Section 2, Dominance Under Article 82, and Fouls in Football," George Mason University Fall 2005 Antitrust Symposium, Washington, DC, September 20, 2005.

"Four Questions About Horizontal Merger Enforcement," American Bar Association Antitrust Section Economics Committee Brown Bag Presentation, Washington, DC., September 14, 2005.

“Is It Live Or Is It Memorex? Models of Vertical Mergers and Antitrust Enforcement Association of Competition Economics (ACE) Seminar on Non-Horizontal Mergers,” Competition Commission, London, UK, September 7, 2005, and Fondation Universitaire, Brussels, Belgium September 8, 2005.

“Challenges in Identifying Anticompetitive Dominant Firm Behavior,” National Economic Research Associates (NERA) 2005 Antitrust and Trade Regulation Seminar, Santa Fe, New Mexico, July 7, 2005.

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“Petroleum Industry Consolidation,” Joint Economic Committee of Congress, May 23, 2007.

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Reports on damages on behalf of Governor Pedro Rosselló and other officials of the Commonwealth of Puerto Rico regarding damage estimates in *El Dia, Inc., et al. v. Pedro Rosselló* (US District Court for the District of Puerto Rico, Civil Action No. 97-2841 JAF) (1999).

Report entitled "Pricing Flexibility in Exchange Access Reform" submitted by GTE, reply comments. Federal Communications Commission (CC Docket No. 96-262 et al.) (1997).

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Reports for Turner Broadcasting on the treatment of affiliate transactions in cable television price regulations (Federal Communications Commission) (1994).

Written testimony on behalf of Devotional Broadcasters regarding appropriate procedures for allocating royalties paid by cable operators among different classes of programs on retransmitted broadcast signals (Copyright Arbitration Royalty Panel) (1993).

Deposition testimony for Long Lake Energy Corp. regarding market definition in monopolization suit against Niagara Mohawk Corporation (1991).

Affidavit concerning class certification in a class action suit against bottlers of Coke and Pepsi. Affidavit argued that a conspiracy to raise the price of colas sold on promotion to grocery stores affected soft drink prices in general (1989).

Report and trial testimony on behalf of Record Club of America regarding damages in a breach of contract suit against United Artists (US District Court, Southern District of New York) (1988).

OTHER SIGNIFICANT CASES

Taboola – Outbrain proposed merger – Analysis for pre-merger review of two daily fantasy sports sites (2019-2020).

Google – Analysis and presentations to CADE staff and commissioners on behalf of Google with respect to its investigation into alleged bias in Google’s search results in Brazil. (2017-2019).

Fan Duel – DraftKings proposed merger – Analysis for pre-merger review of two daily fantasy sports sites (2016-2017).

Wedding Wire – The Knot merger – Analysis for pre-merger review of two wedding planning sites (2018),

Google - Analysis and presentations to CADE on behalf of Google with respect to CADE’s investigations into alleged bias in Google’s search results in Brazil. (2017-2018).

The Clearing House (TCH) - Antitrust analysis of TCH’s Real-Time Payment System and associated Request for Payment functionality. Member of advisory panel to recommend interbank transfer fee. (2016-21).

Trulia – Zillow merger – Pre-merger review and presentation to FTC regarding merger of two real estate listing Web sites (2015).

Google – Analysis and presentation to FTC on behalf of Google with respect to FTC’s investigation into alleged bias in Google’s search results. (2011-2012).

OTHER PROFESSIONAL ACTIVITIES/DISTINCTIONS

Panelist, “Competition and Consumer Protection in the 21st Century,” Federal Trade Commission Hearings, October 15, 2018.

Panelist, “Challenges of the Federal Law on Economic Competition,” CIDE, Mexico City, April 4, 2014.

Panelist, “Horizontal Merger Guideline Review Project,” joint Department of Justice and Federal Trade Commission Workshop, New York, NY, December 8, 2009.

Panelist, “Section 5 of the FTC Act as a Competition Statute,” Federal Trade Commission Workshop, Washington, DC, October 17, 2008.

Panelist, “FTC at 100: Into our Second Century,” Federal Trade Commission Roundtable, Washington, DC, July 29, 2008.

Participant, Academic Consultants Meeting on Non-Traditional Financial Services, Federal Reserve Board, April 16, 2008.

Presenter, Fundamentals of Antitrust Economics, American Bar Association Antitrust Section Spring Meeting, 2007, 2008.

Editorial Board, *Journal of Industrial Economics*, 2002–2006, (Associate Editor, 1996–2002).

Editorial Board, *Review of Industrial Organization*, 2002–2005.

Special Consultant, National Economic Research Associates, 1994–2005.

Member, Science Advisory Board/Illegal Competitive Advantage, United States Environmental Protection Agency, 2004.

Broderick Prize for Service to Undergraduate Community, Boston University, 2004.

Who's Who in America (first listing in 2003).

Principal Investigator: "A Statistical Mechanics Approach to Coase's Theory of the Firm," National Science Foundation Grant SES-0113103, 8/1/01–7/31/02.

COURSES TAUGHT

Boston University

Undergraduate: Modeling Business Decisions and Market Outcomes (course designer and director), Probability and Statistics, Business History, "Blood and Money," Keynes' Economic Consequences of the Peace: Lessons for Today

Masters: Managerial Economics, Public Policy toward Business, Quantitative Methods, Health Care Economics, Health Care Finance, Economics of Strategic Planning

Executive: Managerial Economics, Public Policy toward Business, Microeconomics (Korean Executive MBA), Macroeconomics

Doctoral: Cross-disciplinary Theory and Research

MIT

MBA: Microeconomics, Economics of Strategic Planning

Columbia

MBA: Business Economics, Economics of Strategic Planning, Econometrics, Industrial Organization

Doctoral: Microeconomics, Industrial Organization

APPENDIX B: FURTHER SUPPORTING ANALYSIS

B.1 Break-even analysis by borough

112. As the rental income within NYC varies between the different boroughs, Table 10 presents separate results for each NYC borough. The same methodology described in Section 4.2 is used.
113. The highest number of break-even nights is in the borough of Manhattan in 2021, where the number of break-even nights was 273 and the lowest number is for Staten Island at 144. Overall, the break-even number of nights seem to have an upward trend, indicating that gains from STRs have decreased between 2017 and 2021.

Table 10: Average number of break-even nights by borough in NYC and year, 2017-2021

Borough	2017	2018	2019	2020	2021
Bronx	158	171	164	178	179
Brooklyn	188	196	206	237	207
Manhattan	214	210	207	273	234
Queens	169	171	182	198	171
Staten Island	101	128	153	164	144

Source: CRA analysis of Airbnb, Zillow, and ACS data.