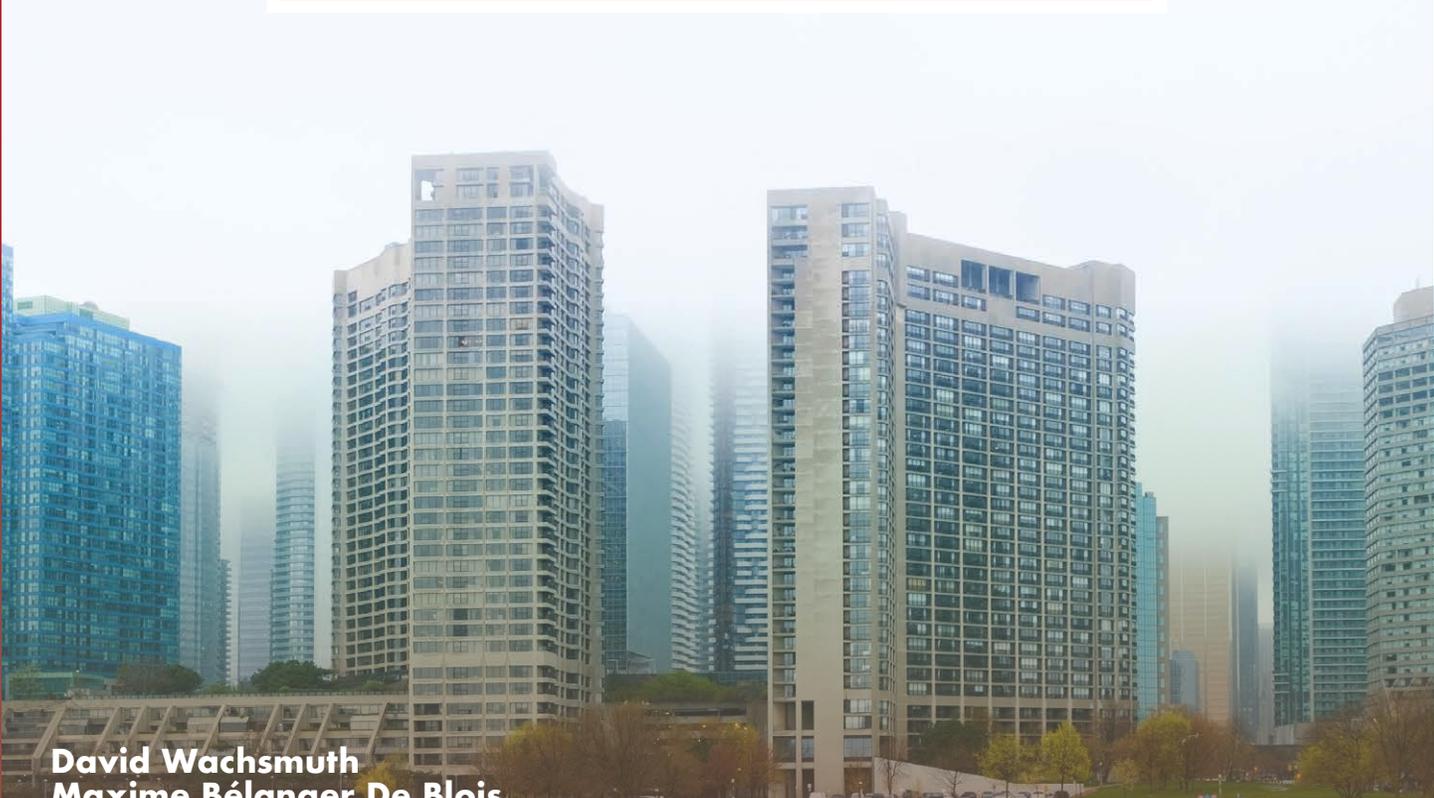# Short-term rentals in the City of Toronto

Market overview and regulatory impact analysis

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UP GO

Executive summary

This report analyzes short-term rentals (STRs) in the City of Toronto, with specific reference to the Covid-19 pandemic and the City new STR regulations. It provides a market overview of STRs in Toronto. It measures the impact of STRs on Toronto's housing market. It provides an analysis of STR units that have returned to the longer-term rental market. It assesses the early impact of the City's STR regulations on the size and character of the STR market, and assesses compliance rates among current STR operators. And it analyzes the financial conditions that might influence an STR host's decision to return their listings to the long-term market.

SHORT-TERM RENTALS IN TORONTO: MARKET OVERVIEW

- There were **9,100 active STR listings in Toronto housing units in 2020**, which collectively earned $140.4 million. This is a dramatic decline in comparison with 2019; **the Covid-19 pandemic reduced reservations by 68.4%.**

- A quarter of all listings are in the Spadina-Fort York ward. More than three fifths of Toronto's STR listings are entire homes, and **entire homes are responsible for 84.2% of revenue**.

- Revenue is concentrated unevenly among hosts, with **the top 10% earning 59.3% of revenue**. Commercial operators who control multiple STR listings account for 34.9% of listings and 35.7% of revenue.

STR HOUSING IMPACTS

- **Prior to the Covid-19 pandemic, there were 8,300 housing units operating as dedicated STRs in Toronto.**

- **In 2020 the number of dedicated STRs fell by 61.3% to 3,160**.

- **In the Spadina-Fort York area, 1.2% of all housing was operating as dedicated STRs at the end of 2020**, despite the pandemic, while the figure was 0.5% in University-Rosedale and 0.3% in Toronto Centre.

STRS RETURNING TO THE LONG-TERM MARKET

- Using image recognition techniques, **we identified 3,476 unique Airbnb listings which were posted as long-term rentals (LTRs) on Craigslist or Kijiji between March and December 2020**.

- **These former STRs** have asking rents on average 11.6% higher than other LTR listings, but **are correlated with a 12.1% decrease in overall asking rents in Toronto**.

- The overwhelming majority of STR listings transferred to LTR platforms are commercial

operations. 42.2% have fully transitioned back to the long-term market, 23.6% have been temporarily blocked on Airbnb and may return to being STRs in the future, and 34.1% failed to be rented on LTR platforms and instead remain active on Airbnb.

STR REGULATORY COMPLIANCE

- In early January, **Airbnb removed 2,600 Toronto listings which had failed to register** under the City's new mandatory STR registration. These were mostly listings which had been inactive for a year or more.

- **Airbnb converted the majority of remaining listings—8,400—to minimum rental length of 28 days**, which exempts them from the registration requirement.

- **In November of 2020, only 6.3% of Toronto listings had a minimum stay of 28 days or more, while at the beginning of February 2021 it was 72.2%.** 9.7% are operating with a valid registration, 7.4% use a valid registration but for

multiple listings, 6.5% display a fake registration number or no registration information, and the remainder (1.6%) claim to be exempt.

- Frequently rented entire-home listings have the highest rate of valid registrations (28.8%) among listing categories. Multilistings have the highest rate of duplicate registrations (19.4%). Duplicate listings and listings operating under a fake registration number are the ones that earned the most revenue during the pandemic.

BRINGING MORE STRS BACK TO THE LONG-TERM MARKET

- Relative to other listings, STR listings which transitioned to the LTR market had higher monthly revenue in 2020 but a greater decrease in year-over-year revenue.

- The viable monthly rent at which we predict remaining dedicated STRs could be induced to return to the long-term market ranges from $1,430 for studio apartments in low-cost areas of the city to $3,890 for 4-bedroom apartments in high-cost areas.

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1. Introduction

In January 2021, researchers from the Urban Politics and Governance research group (UPGo) at McGill University were commissioned by the City of Toronto to conduct market research and analysis on the impact of the City's January 2021 regulations on short-term rentals, the impact of the Covid-19 pandemic on the short-term rental market in the City of Toronto, and the financial circumstances under which short-term rentals are returning to the long-term market. This report will shed light on the following topics:

1. A general market overview of short-term rentals (STRs) in Toronto, including the volume, revenue, type, size and distribution of units, the presence of dedicated commercial operations, and the impact of Covid-19 on short-term rentals.
2. The impact of STRs on Toronto's housing market, in particular the number of housing units taken off the long-term market. This analysis is also complemented by the impacts of the Covid-19 on STR listings that are operated on a full-time basis in Toronto.
3. Information about STRs returning to the LTR market, including the number of listings that have returned; their spatial distribution, size and asking rents; the extent to which they are commercial operations or casual home sharing operations; and whether they are likely to return to the STR market when conditions improve.
4. The impact of the City of Toronto's new STR registration system on the operations of short-term rentals in the City.
5. The asking rents under which commercial STRs have returned to the long-term market.

Data and methodology are discussed in the Appendix, and all the code used to generate the analysis in the report is available online at https://github.com/UPGo-McGill/toronto-report.
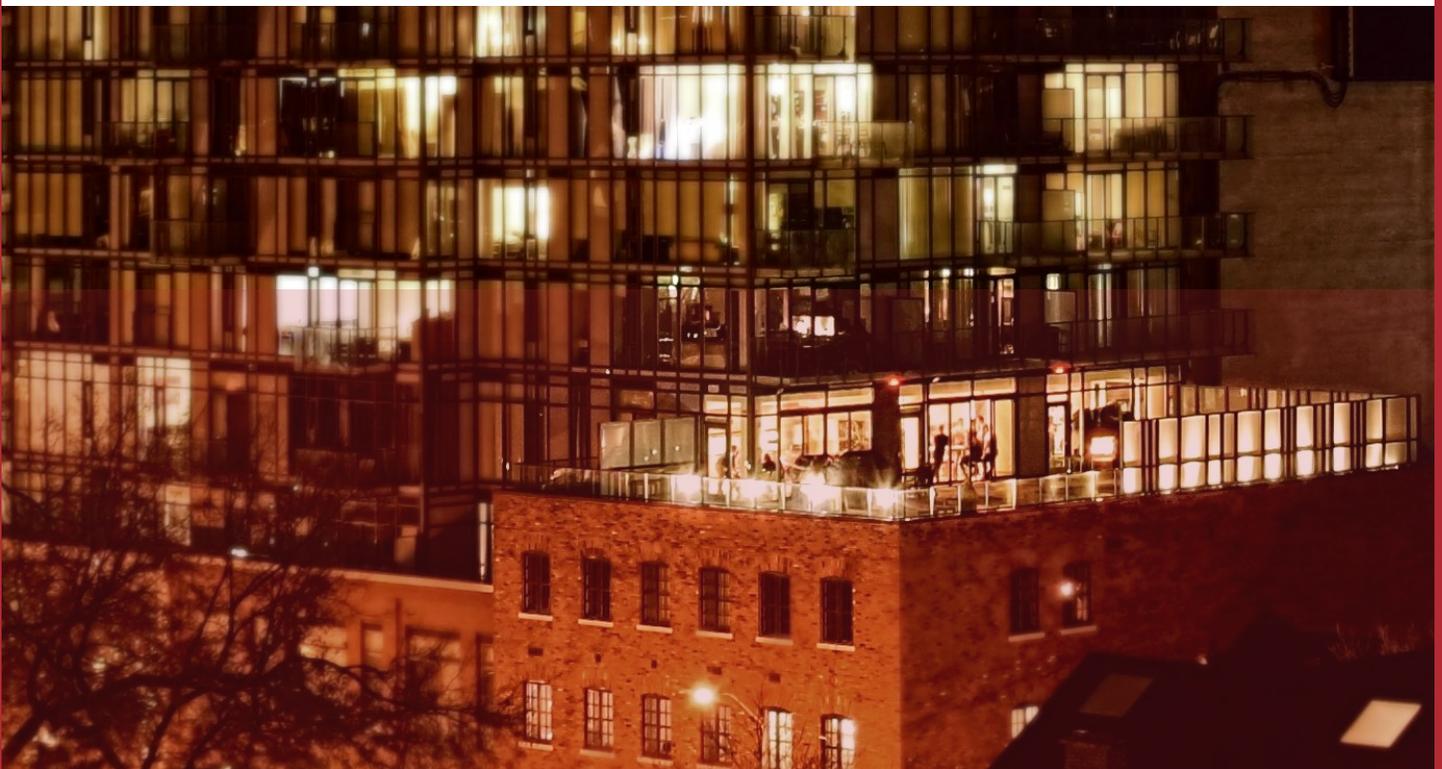
2. Short-term rentals in Toronto: Market overview

There were 9,100 active STR listings in Toronto housing units in 2020, which collectively earned $140.4 million. This is a dramatic decline in comparison with 2019; the Covid-19 pandemic reduced reservations by 68.4%. A quarter of all listings are in the Spadina-Fort York ward. More than three fifths (62.0%) of Toronto's STR listings are entire homes, and entire homes are responsible for 84.2% of all revenue. Revenue is concentrated unevenly among hosts, with the top 10% earning 59.3% of revenue, and the top 1% earning 31.3%. Commercial operators who control multiple STR listings account for 34.9% of listings and 35.7% of revenue. Toronto has the largest STR market of any Canadian city.

ACTIVE DAILY LISTINGS AND ANNUAL REVENUE

Active daily listings are listings which were displayed on Airbnb or Vrbo on a given day, and were either reserved or available for a reservation. It is the most reliable means of determining the overall size of the STR market in a location, particularly with respect to change over time. In 2020 there was an average of 9,100 active daily listings (Figure 1) operated by
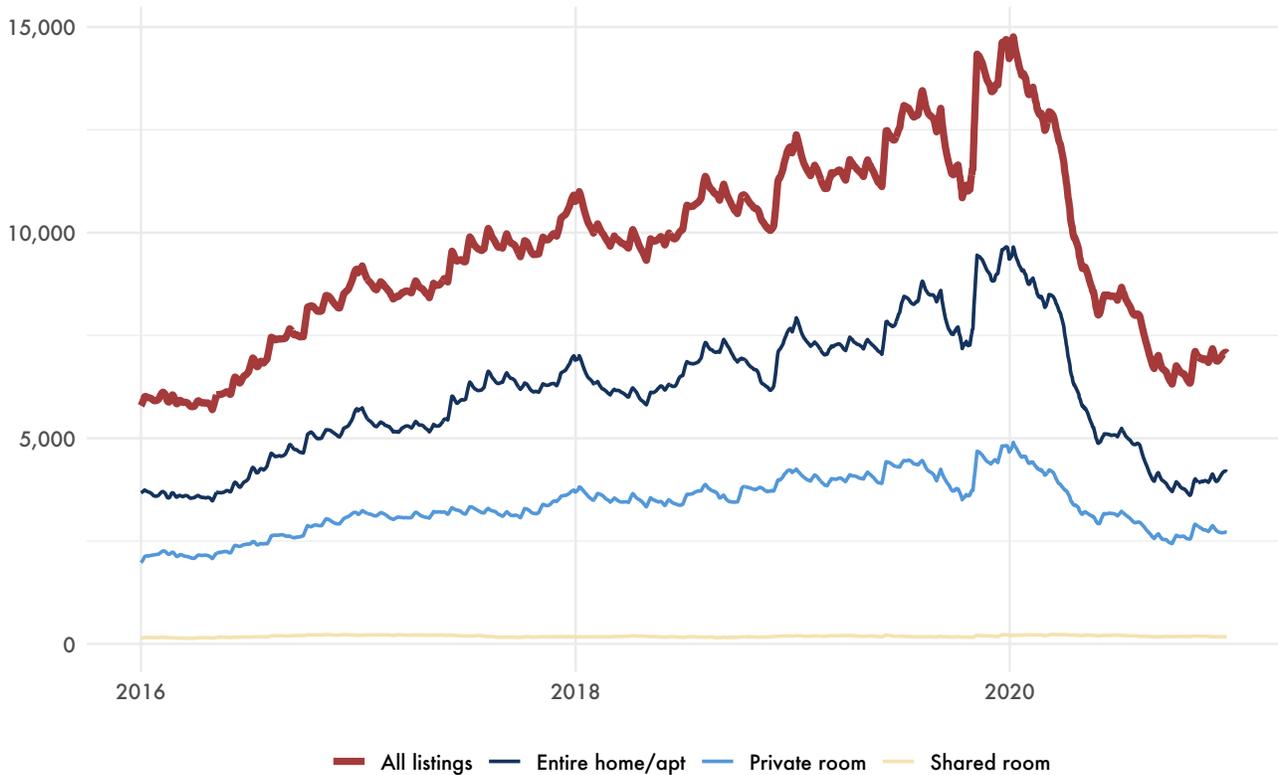
Figure 1. Active daily STRs in the City of Toronto (7-day average)

an average of 5,130 hosts. These hosts collectively earned $140.4 million—an average of $15,400 per daily active listing or $27,400 per active host. Because of the collapse of STR demand during the Covid-19 pandemic, these numbers are substantially lower than 2019, when there was an average of 12,270 active daily listings operated by 7,020 hosts, who earned on average $47,400.

There was also a daily average of 12,250 listings which were visible on the Airbnb and Vrbo websites but were locked by the host from receiving reservations. The presence of these listings can erroneously suggest that a city's STR market is larger than it is. When these blocked but inactive listings are included, the average listing earned $6,100 in 2020, and the average host earned $12,000. Finally, there was a daily average of 340 listings that were not located in

private housing units (B&Bs, hotels, etc.), which have been excluded from the analysis in this report. All the material which follows pertain to short-term rentals located in Toronto's residential housing stock.

Active daily listings peaked in January 2020 at 15,020, and have since declined. Due to the Covid-19 pandemic, there were 25.7% fewer active listings on average in 2020 than in 2019, and 57.8% less revenue. Prior to 2020, Toronto's STR market was growing rapidly—active listings and revenue respectively increased by 17.9% and 18.3% from 2018 to 2019. It is likely that this trend would have continued in 2020 in the absence of the pandemic. In general, the number of STR listings available in the City of Toronto peaks during late summer and winter holidays and falls in between these periods (Figure 1).

LOCATION OF STR LISTINGS AND REVENUE

STR activity in Toronto is highly concentrated downtown (Figure 2). In particular, the Spadina-Fort York ward (which includes the Waterfront area), accounts for 28.2% of all listings, and an even higher share of host revenue (40.7%). Spadina-Fort York is followed by the University-Rosedale ward (10.0% of active listings and 10.7% of revenue) and

the Toronto Centre ward (8.4% of active listings and 8.3% of revenue). When measured in per-capita terms, Spadina-Fort York and University-Rosedale have the highest concentrations of STRs, at 3.4% and 1.6% respectively. In all other wards STRs account for between 0.3% and 3.4% of total dwellings (Table 1).
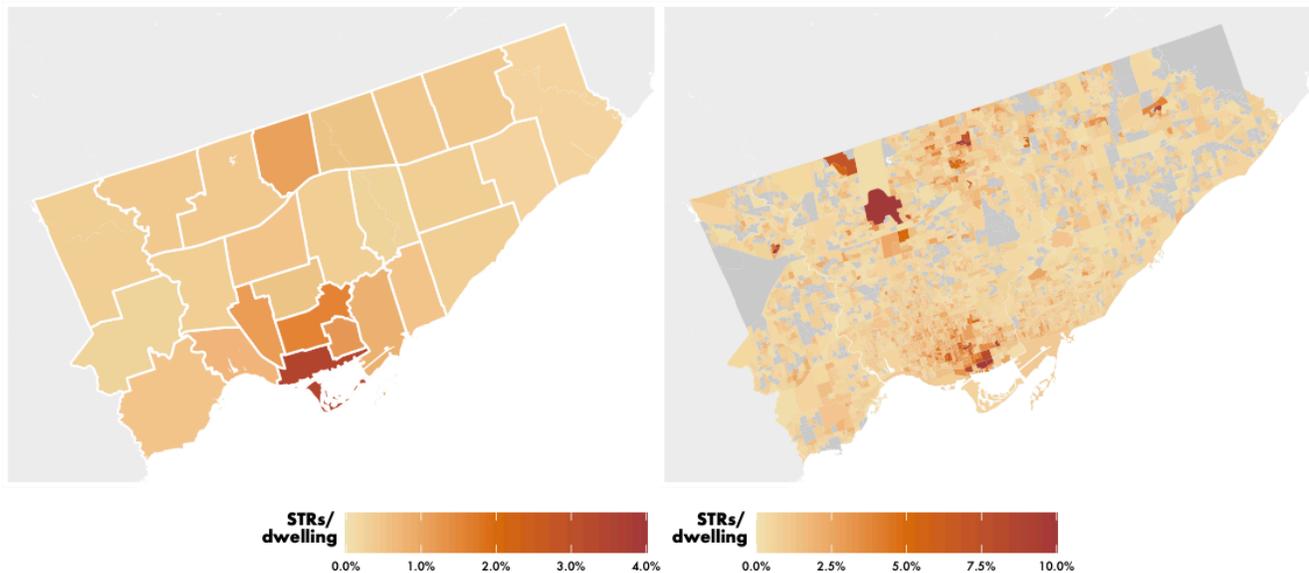

Figure 2. Active STRs as a share of all dwelling units in Toronto, by ward (L) and dissemination area (R)

LISTING TYPES AND SIZES

STRs listed on Airbnb can be one of four types: entire homes or apartments, private rooms, shared rooms, and hotel rooms. We have excluded the latter from our analysis, since we focus only on STRs located in housing units. Most policy attention has been focused on entire-home listings, both because these listings are most likely to generate harmful negative externalities, including housing loss and area nuisance, and because entire-home listings tend to be the most common.

Table 2 provides the distribution of the listings by listing type in 2020. The majority of STRs in Toronto are entire homes, a category which includes single-family homes, townhouses, apartments and condominiums. Half (50.4%) of these were one-bedroom housing units, and more than a quarter (27.4%) were two-bedrooms units. 13.0% had three or more bedrooms, and 9.3% were studios. In general, studios and one-bedroom units are over-represented on STR platforms in comparison with the City's overall housing stock.

Ward	Active listings	Annual listing growth	Active listings as % of dwellings	Annual revenue (million)	Annual revenue growth
City of Toronto	*9,100*	*-25.7%*	*0.8%*	*$140.4*	*-57.8%*
Spadina-Fort York	2,570	-25.9%	3.4%	$57.2	-58.3%
University-Rosedale	910	-31.7%	1.6%	$15.0	-62.0%
Toronto Centre	770	-28.3%	1.2%	$11.7	-64.3%
Willowdale	580	-25.7%	1.1%	$7.0	-48.0%
Davenport	570	-28.4%	1.2%	$6.8	-63.3%
Toronto-Danforth	380	-27.6%	0.8%	$5.9	-55.3%
Parkdale-High Park	360	-32.2%	0.7%	$6.0	-55.5%
Toronto-St. Paul's	300	-22.7%	0.5%	$3.4	-59.7%
Etobicoke-Lakeshore	280	-19.9%	0.4%	$3.8	-48.9%
Beaches-East York	240	-35.3%	0.5%	$3.7	-55.7%
Don Valley North	230	-29.7%	0.5%	$2.2	-51.8%
Eglinton-Lawrence	210	-12.9%	0.4%	$2.1	-60.7%
York Centre	170	-5.8%	0.4%	$1.5	-43.1%
Humber River-Black Creek	160	-15.4%	0.4%	$1.0	-53.1%
York South-Weston	150	-23.7%	0.3%	$1.4	-53.9%
Don Valley West	150	-16.7%	0.4%	$2.0	-45.1%
Scarborough Southwest	140	-21.4%	0.3%	$1.4	-50.5%
Scarborough-Agincourt	140	-25.1%	0.4%	$1.2	-47.5%
Scarborough Centre	140	-15.2%	0.3%	$1.3	-40.7%
Etobicoke North	140	-15.1%	0.3%	$0.9	-54.0%
Scarborough North	130	-20.9%	0.4%	$1.0	-40.8%
Etobicoke Centre	120	-22.7%	0.3%	$1.7	-53.0%

Table 1. Wards with at least 100 daily active listings in 2020

Listing type	Active listings	Annual revenue (million)	% of active listings	% of annual revenue	Annual listing growth
Entire home/apt	5,660	$118.4	62.0%	84.2%	-28.6%
Private room	3,270	$21.6	35.8%	15.4%	-21.5%
Shared room	200	$0.6	2.2%	0.4%	5.9%

Table 2. Listing type prevalence in the City of Toronto

In 2020 entire-home listings accounted for 62.0% of all daily active listings, and 84.2% of total host revenue. (Private rooms accounted for nearly all of the remainder.) Moreover, the dominance of entire-home listings in Toronto's STR market is increasing over time.

STR GROWTH RATES

Until the end of 2019, the number of active STRs listings was steadily increasing in the City of Toronto. Figure 3 shows the change in active listings and revenue relative to one year earlier, which is a convenient way to remove seasonal variation to identify underlying growth trends. The figure indicates that, throughout 2017 and the first half of 2018, there was great growth in the

Figure 3. Change in daily active listings and host revenue compared to one year earlier (14-day average)

revenue earned by hosts. From mid-2018 to late 2019, both active listings and revenue were greater than the year before, albeit with less growth. Both active listings and revenue grew sharply during the 2019 winter season. The pandemic halted Toronto's STR market growth, with active listings and revenue declining since March.

Overall, the year-over-year change in average active listings from 2016 to 2017 was 34.2%, the year-over-year change from 2017 to 2018 was 11.4%, and the year-over-year change from 2018 to 2019 was 17.9%. In 2020, because of the Covid-19 pandemic, the year-over-year change in active daily listings is -25.9%.

Figure 4 provides a closer look at daily reservations since 2019, comparing the actual trajectory of reservations during the pandemic with what the trajectory of reservations would have been expected to be, based on previous growth in Toronto's STR market but in the absence of the pandemic. (To do this, we use seasonal decomposition to identify the regular seasonal fluctuations in STR activity and separate them from the underlying patterns of growth or decline.) In total, from March through December 2020, we estimate that there have been 1,979,600 fewer STR nights reserved than would normally have been expected to occur. The 916,000 total nights reserved in this time period is only 31.6% of the 2,895,600 nights total that would represent the previous growth trend.

STR host revenue decreased by a staggering 57.8% in 2020 compared to 2019. To offer some perspective, from 2018 to 2019, STR revenue increased by 18.3%. Throughout the May-December period of 2020, moreover,
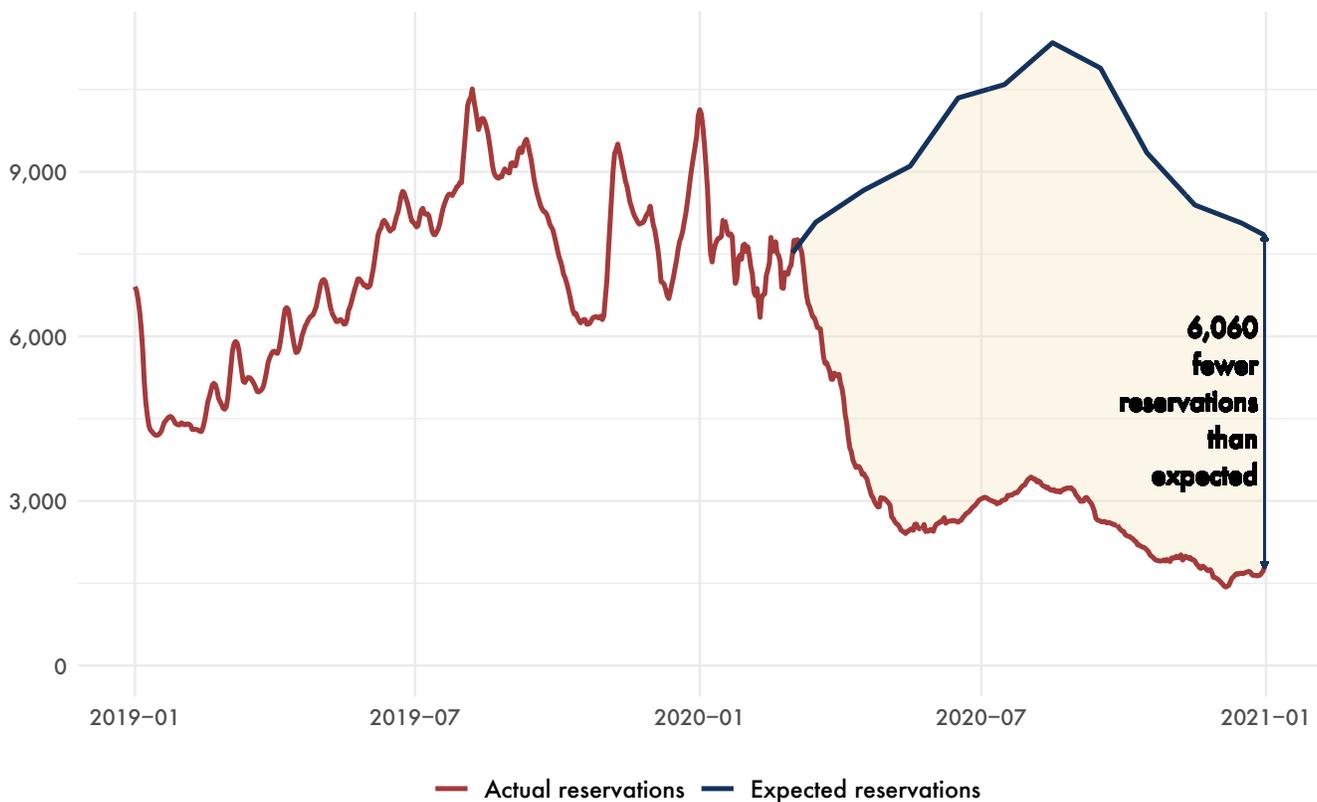

Figure 4. Actual and expected reservations during the Covid-19 pandemic (7-day average)

nightly prices have been an average of 23.0% lower than expected. Spread across the 916,000 nights reserved during this period, this means that STR operators collectively earned $32.6 million less than they would have on their bookings in the absence of the pandemic. When the lower prices on reservations which did occur is combined with the reservations which did not occur, our estimate is that Toronto's STR hosts lost a total of $361.9 million in revenue between March and December 2020 because of the Covid-19 pandemic.

REVENUE DISTRIBUTION AMONG STR HOSTS

One way to understand the structure of an STR market is to examine the distribution of revenue among STR hosts. Is revenue widely distributed between many part-time hosts of single listings, or concentrated among a small number of commercial operators who control many full-time listings? While hosts are identified on Airbnb or Vrbo with unique accounts, these accounts are not necessarily an accurate guide to the individuals or companies which operate STR listings, since a given person or group of people can create as many host accounts as they wish, and split their listings among these accounts. What may appear superficially as a large number of small STR operators could thus be in reality a much smaller number of operators controlling many accounts each. To address this possibility, we use custom image recognition software to identify identical photographs which are used across multiple listings, and thereby construct groups of host accounts which are either a single operator or a network of operators working in collaboration. If multiple, apparently separate host accounts use the identical photo on the webpages of their STR listings, this is very strong evidence that these accounts are related.
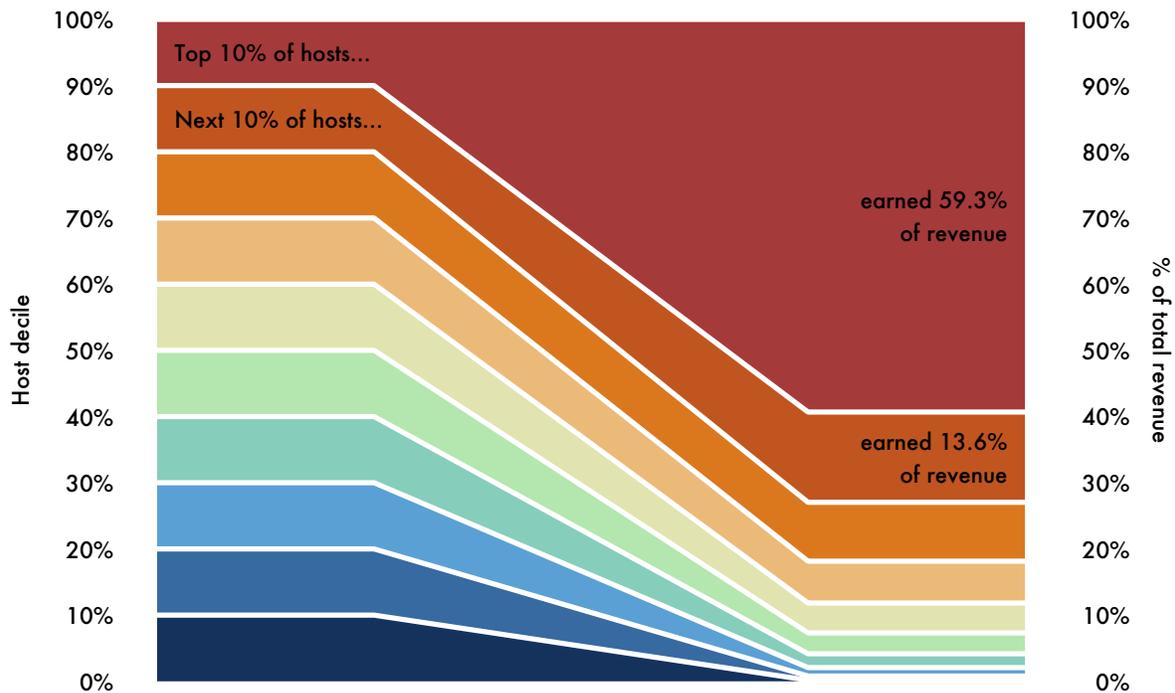

Figure 5. STR host revenue distribution in the City of Toronto

Among all the STR hosts who earned revenue in the City of Toronto in 2020, the median revenue was $4,500. Throughout the City of Toronto, there were 29 hosts that earned more than $250,000 in 2020, which is 51 fewer hosts than in 2019. Figure 5 shows the percentage of the total $140.4 million in STR revenue which accrued to each decile of hosts. The figure shows that revenue is disproportionately concentrated among a small number of hosts; the top 10% earned 59.3%: the top 5% earned 48.4% of revenue, while the top 1% of hosts earned 31.3% of all revenue.

To put this revenue distribution in context, Montreal's top 10% of STR hosts earned 68.8% of all revenue in 2019. On the other hand, Vancouver's top 10% hosts only earned 43.2% of all revenue in 2019.

THE COMMERCIALIZATION OF TORONTO'S STR MARKET

Some hosts operate multiple STR units, which strongly suggests that they are not casual home sharers, but rather commercial operators who are not hosting STRs in their principal residence. To take the simplest case, a host with two or more entire-home listings on the same day cannot be operating both listings out of their principal residence. We consider entire-homes to be "multilistings" if they are operated by hosts who are simultaneously operating other entire-home listings. We define private-room multilistings as cases where a host has three or more private-room listings operating on the same day. Since 96.0% of entire-home listings have three or fewer bedrooms, there will be extremely few cases where a host operating three private-room STR listings in a dwelling unit has not converted the entire unit into a dedicated STR.
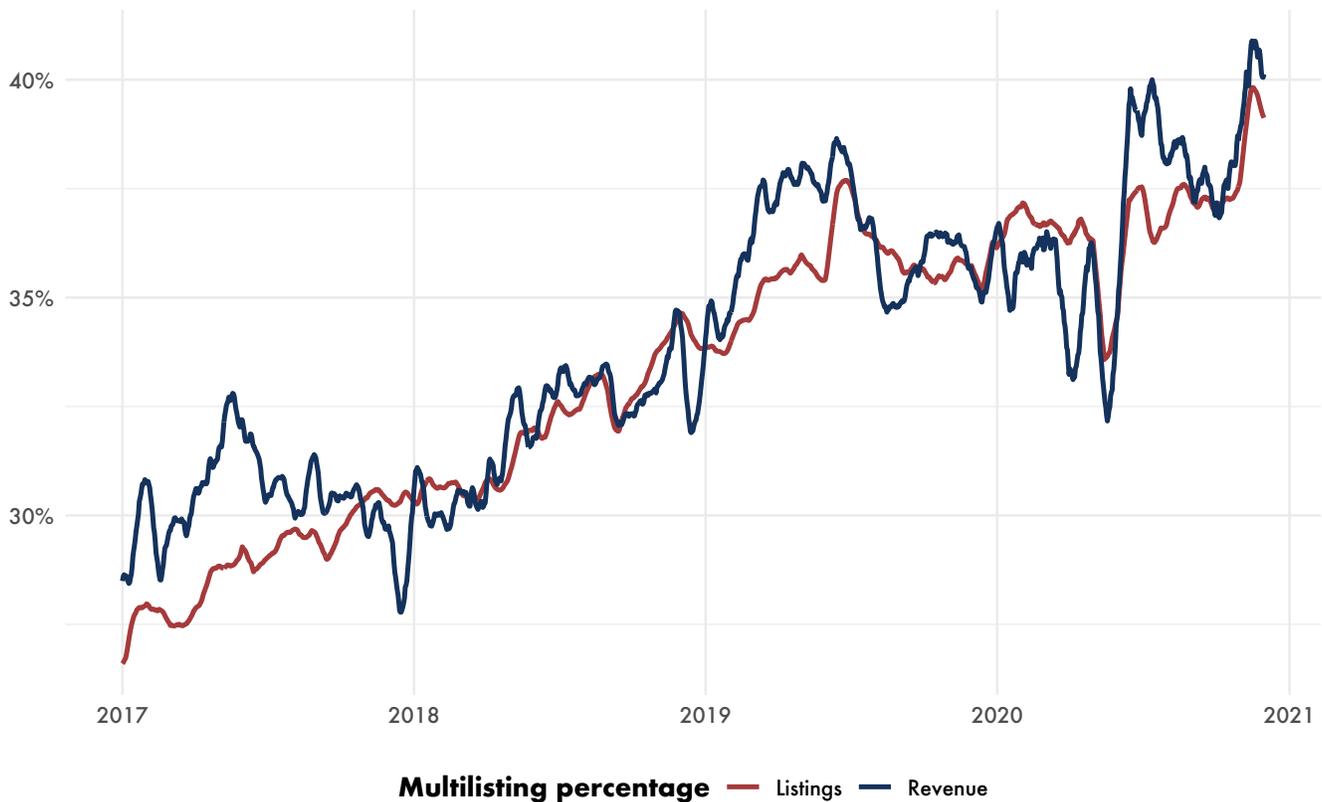

Figure 6. The percentage of active listings and revenue accounted for by multilistings in Toronto (14-day average)

In 2020, 34.9% of active listings in Toronto were multilistings, earning 35.7% of total host revenue. Multilistings had been growing steadily since 2017, both in terms of listings and revenue percentage, until the Covid-19 pandemic, when their proportion dropped somewhat (Figure 6). Still, through the fall of 2020 multilistings were earning a bit more than 4 out of every 10 dollars on STR platforms in Toronto.

These figures should be taken as highly conservative estimates. Many commercial operators will use different Airbnb or Vrbo accounts to manage their listings. If multiple listings share the same photographs then our image recognition software will be able to connect them together, but it is otherwise difficult to determine whether two accounts belong to the same person. Moreover, many STR commercial operators only operate a single listing, but operate it on a full-time basis. A house owner with a secondary suite, or the owner of an investment condo who operates a STR in it, are clearly commercial operators running listings which are not their principal residences, but they would not be counted by this method.

TORONTO IN COMPARISON WITH OTHER MAJOR CANADIAN CITIES

In 2020, Toronto had the largest STR market in the country by both active listing numbers (9,100) and host revenue ($140.4 million), followed in both cases by Montreal and Vancouver (Table 3). However, in relative terms, Vancouver stands considerably ahead of both Toronto and Montreal. Vancouver had the most active listings per 1000 households (8.7 compared to 7.7 in Toronto) and the most revenue per listing ($22,800 compared to $15,400 in Toronto). The pandemic has hit the STR markets of the ten largest Canadian metropolises differently. Small markets such as Brampton and Hamilton have seen their daily active listings and yearly revenue decrease less than bigger markets. On the other hand, both Montreal and Vancouver have experienced drastic drops in revenue, by -60.3% and -58.0% respectively. Toronto has been the least severely affected of the largest cities, with a 42.2% decrease in STR revenue.

City	Active listings	Listings per 1000 households	Annual revenue (million)	Revenue per listing	YOY change in listings	YOY change in revenue
Brampton	30	2.1	$4.8	$13,200	-12.3%	-37.2%
Calgary	1,960	4.0	$31.1	$15,800	-29.1%	-36.2%
Edmonton	1,110	2.9	$16.7	$15,100	-18.3%	-23.5%
Hamilton	470	2.1	$8.4	$18,100	-15.4%	-20.8%
Mississauga	820	3.3	$10.4	$12,600	-16.3%	-41.0%
Montréal	5,900	7.0	$90.2	$15,300	-34.8%	-60.3%
Ottawa	1,320	3.3	$23.0	$17,500	-35.5%	-45.8%
Toronto	9,100	7.7	$140.4	$15,400	-25.7%	-42.2%
Vancouver	2,690	8.7	$61.4	$22,800	-29.0%	-58.0%
Winnipeg	590	2.0	$8.9	$15,000	-23.5%	-19.7%

Table 3. 2020 STR activity in the largest ten Canadian municipalities

3. STR housing impacts

Prior to the Covid-19 pandemic, there were 8,300 housing units operating as dedicated STRs in Toronto. Two thirds of all entire-home listings and half of private-room listings were dedicated STRs. Because of the general collapse of STR activity in 2020, the number of dedicated STRs has fallen by 61.3% to 3,160. In the Spadina-Fort York ward, 1.2% of all housing was operating as dedicated STRs at the end of 2020, despite the pandemic, while the figure was 0.5% in University-Rosedale and 0.3% in Toronto Centre.

STR-INDUCED HOUSING LOSS

Toronto's housing market has been under considerable stress in the past years, with housing prices and rents rising, and rental vacancy rates falling. These are symptoms of a market where the supply of housing is insufficient to meet demand. One possible explanation for both the insufficient supply and elevated demand for housing in Toronto is the growth in short-term rentals. Tourists are now able to compete with residents for housing—adding demand to the local housing market—while landlords are now able to shift their properties out of the conventional housing market to become dedicated STRs—reducing the supply of conventional housing. Research has found that renting a housing unit on the STR market frequently offers landlords greater potential revenue than conventional leases (Wachsmuth & Weisler 2018), especially in transit-accessible neighborhoods (Deboosere et al. 2019). Multiple studies have also found that Airbnb and other STR platforms increase housing costs (Barron, Kung, & Proserpio 2017; Horn & Merante 2017; Garcia-Lopez et al. 2019).

One of the major considerations when gauging the impacts of short-term rentals (STRs) on a city, therefore, is the extent to which STRs are removing long-term housing from the market. This process can occur either directly, where tenants of a unit are evicted or not replaced at the end of a lease and the unit is converted to a STR, or indirectly by absorbing new construction or investment properties which otherwise would have gone onto the long-term market. To obtain the exact number of units that have been occupied as STRs, landlords or units would need to be individually surveyed, which is infeasible because STR hosts are mostly anonymous on major STR platforms such as Airbnb and Vrbo. Instead, we use the daily activity of listings, alongside structural characteristics such as listing type and location, to estimate which listings are operating as dedicated STRs and are therefore not available as conventional long-term housing.

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

order to generate an estimate of FREH activity based on three months of listing activity. This allows us to detect listings which are operating in a full-time manner but have not yet been listed for an entire year, and allows us to account for relatively short-term changes in market conditions.

Ghost hostels: In addition to FREH listings, it is possible that entire housing units have been subdivided into multiple private-room listings, each of which appearing to be a spare bedroom or the like, while actually collectively representing an apartment removed from the long-term housing market. We call these clusters of private-room listings "ghost hostels", building on the advocacy group Fairbnb.ca's term "ghost hotels" — multiple FREH listings located in a single building, collectively serving as de facto hotels instead of long-term housing (Wieditz 2017). We detect ghost hostels by finding clusters of three or more private-room listings operated by a single host, whose reported locations are close enough to each other that they are likely to have originated in the same actual housing unit. (Airbnb and Vrbo obfuscate listing locations by shifting them randomly up to 200 m.)

At the end of 2020, there were 2,390 FREH listings in the City of Toronto, and 770 more housing units which were operating as ghost hostels. (We refer to these listings collectively as "dedicated STRs".) In total, therefore, short-term rentals were taking 3,160 housing units off of Toronto's long-term market at the end of the year
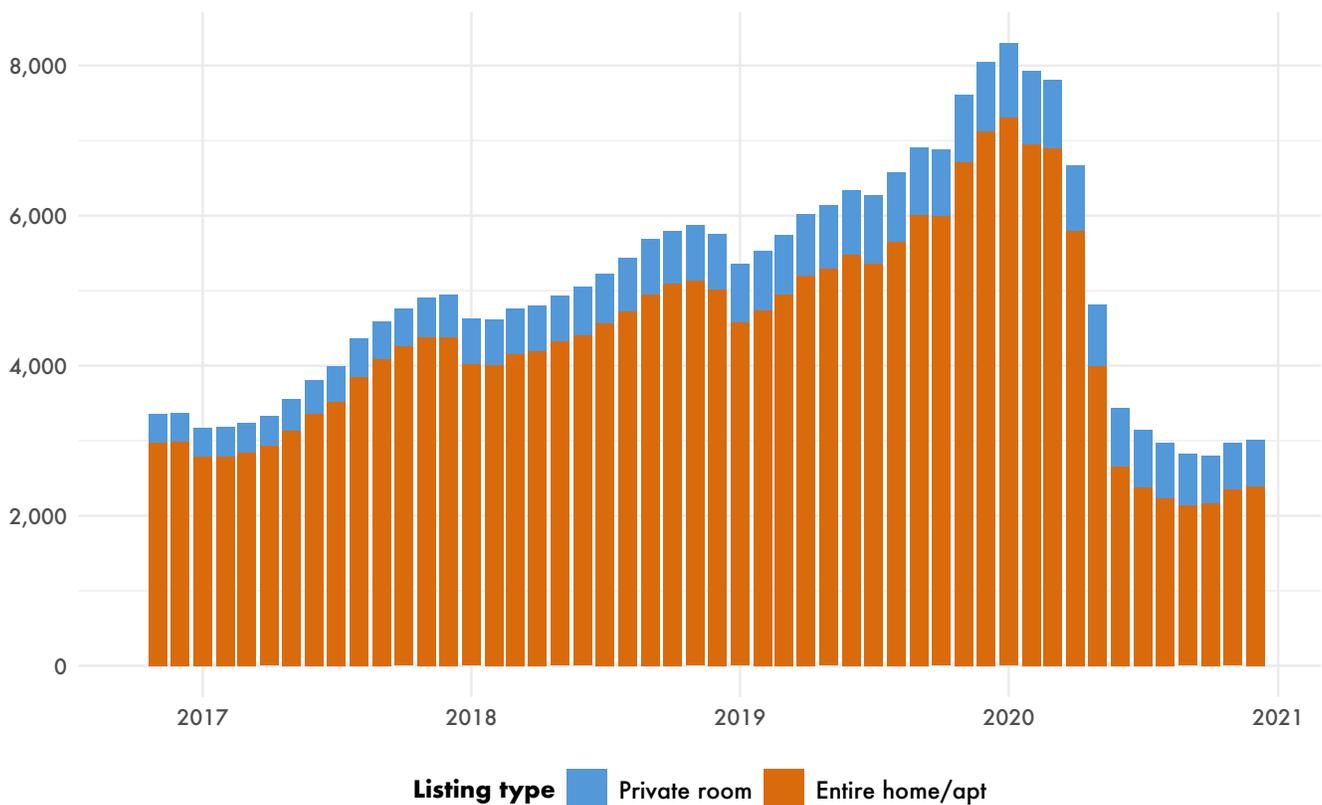
Figure 7: Housing units converted to dedicated STRs in the City of Toronto (monthly average)

(Figure 7). Notably, while the number of active daily listings declined by 25.7% over 2020, the number of housing units which STRs took off of Toronto's housing market decreased at a much sharper rate. There were 61.3% fewer dedicated STRs in 2020 (8,300) than in 2019 (3,160); the pandemic has disproportionately affected commercial operators in the City.

In 2019, two thirds of entire-home listings (65.4%) and half (49.4%) of the private-room listings were taking housing off the long-term market. At the end of 2020 only a quarter (24.4%) of entire-home listings and less than half of (44.2%) private-room listings were being operated in a full-time or close-to-full-time fashion (Figure 8). This does not mean that these listings are no longer dedicated STRs, since they could still be operating full-time but simply not receiving many reservations due to Covid travel restrictions (a possibility we explore

below). Table 4 summarizes STR-induced housing loss patterns by neighbourhood. It demonstrates that the City-wide trend of shrinking dedicated STRs due to the pandemic holds in all neighbourhoods. The year-over-year decline in STR-induced housing loss has been evenly distributed between virtually all wards, with an average of -59.3%. The following section takes a closer look at the impact of Covid-19 on frequently rented entire-home listings.

The 3,160 housing units taken off of Toronto's housing market in 2020 are 0.3% of the total amount of housing in the city, and this housing loss has been concentrated in small parts of the city. Figure 9 shows the proportion of each ward or dissemination area's housing stock which was operated as a dedicated short-term rental as of the end of 2020. The maps show a tale of two cities: in most of Toronto, there are relatively few dedicated STRs, while in the centre of the city as well as a few

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transit corridors they are ubiquitous. In the Spadina-Fort York ward, 1.2% of all housing units were operating as dedicated STRs at the end of 2020, even in the face of Covid-19. The figure is 0.5% for University-Rosedale and 0.3% for Toronto Centre. In the Downtown CMHC zone, the rental vacancy rate was 2.9% in 2019, while the number of STRs contributing to housing loss in the Spadina-Fort York in 2019 was 3.5% of all housing units. This means that, prior to the pandemic, there were slightly more dedicated STRs in this neighbourhood than there were vacant apartments for rent.

Figure 8: The percentage of active STR listings contributing to housing loss each day in Toronto (14-day average)

COVID'S IMPACT ON FREQUENTLY RENTED ENTIRE-HOME LISTINGS

The number of housing units in Toronto lost due to dedicated STRs reached its all-time peak (8,370) at the end of 2019. Most of these (7,310) were FREH listings, with the remainder (1,050) being ghost hostels. During the fall of 2020, the number of FREH listings had dropped to its lowest amount since we began tracking it in 2016, with just 2,810 listings in October displaying availability and reservations consistent with historical patterns of full-time STR activity in Toronto.

One possibility is that these formerly FREH listings are no longer operating as STRs, either permanently (the listings were deactivated) or temporarily (the listings were blocked from receiving reservations). Under this possibility the listings may have been returned to the longer-term rental market. Another possibility is that the listings have remained open for business as short-term rentals, but the dramatically decreased demand for tourist accommodations means that the listings

Ward	Housing loss (2019)	Housing loss (2020)	Year-over-year growth (%)	% of housing lost (2020)
City of Toronto	7,790	3,050	-60.1%	0.3%
Spadina-Fort York	2,660	910	-65.7%	1.2%
Willowdale	570	300	-47.0%	0.6%
University-Rosedale	800	280	-65.3%	0.5%
Toronto Centre	640	230	-64.7%	0.4%
Humber River-Black Creek	290	210	-27.1%	0.5%
Davenport	470	160	-66.3%	0.3%
Parkdale-High Park	340	130	-62.1%	0.2%
Toronto-Danforth	310	120	-61.0%	0.3%
Toronto-St. Paul's	240	100	-59.2%	0.2%
Beaches-East York	250	80	-66.8%	0.2%
Don Valley North	140	80	-45.6%	0.2%
Etobicoke-Lakeshore	200	70	-63.9%	0.1%
Scarborough-Agincourt	90	60	-41.0%	0.2%

Table 4. STR-induced housing loss by ward in the City of Toronto (for wards with at least 50 housing units lost in 2020)
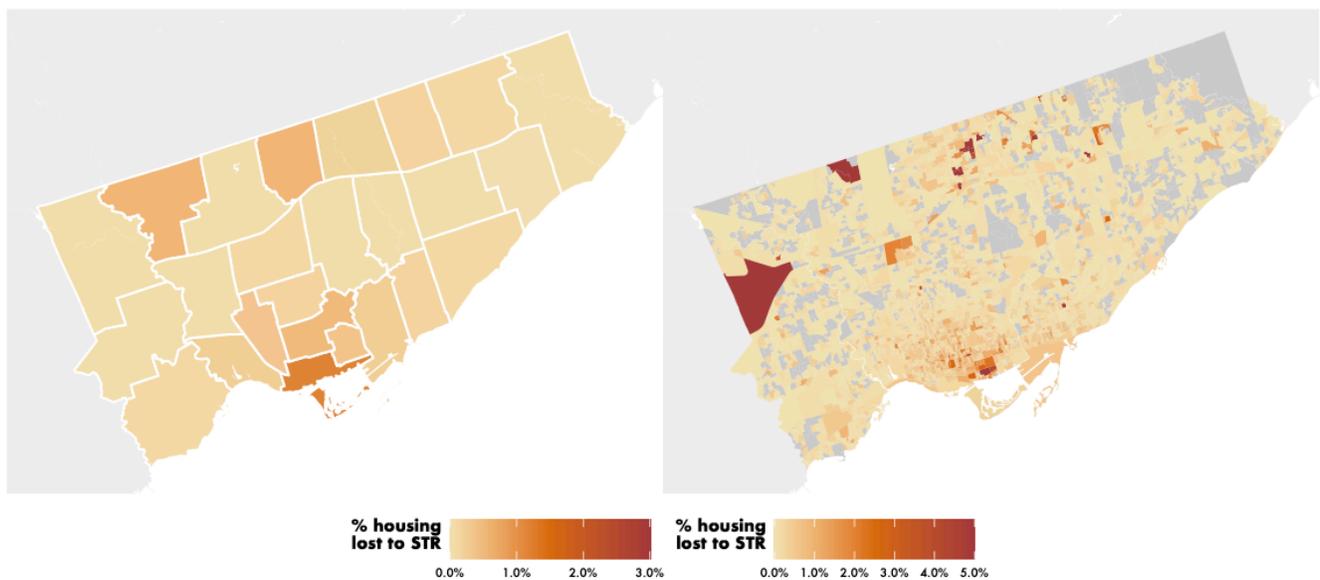

Figure 9. The percentage of housing units converted to dedicated STRs in the City of Toronto, by ward (L) and dissemination area (R)

have not received the level of reservations which our statistical model expects in order to classify the listings as frequently rented.

We adjudicate between these possibilities by comparing the activity of listings which had FREH status in January or February 2020—the months before the pandemic arrived—and listings which did not have this status. There were 7,870 listings which we consider likely to have been FREH in either or both of January and February 2020. Of these listings, 3,660 were no longer listed on Airbnb or Vrbo as of December 31, 2020. This is 46.5% of these listings—almost twice as high as the 26.2% of listings which were FREH in either January or February 2019 and were no longer listed on the STR platforms by the end of August 2019. In total, 51.0% of non-FREH listings active in January or February 2020 were deactivated by the end of December 2020, while the

corresponding figure last year was 38.4%. This means that non-FREH listings have been deactivated at a higher rate this year than last year, but FREH listings have been deactivated at a substantially higher rate this year than last year (Figure 10).

Of the 4,210 FREH listings which remained listed throughout March - December, 1,710 (40.5%) were blocked (i.e. not available for reservations) for all of the month of December, and 2,550 (60.6%) were blocked for a majority of the month. This is extremely rare behaviour for a dedicated STR listing, since December is usually one of the busiest months for tourist accommodations in Toronto. In 2019, only 16.0% of listings which were FREH in January or February were blocked for all of December, and only 22.4% were blocked for a majority of the month.
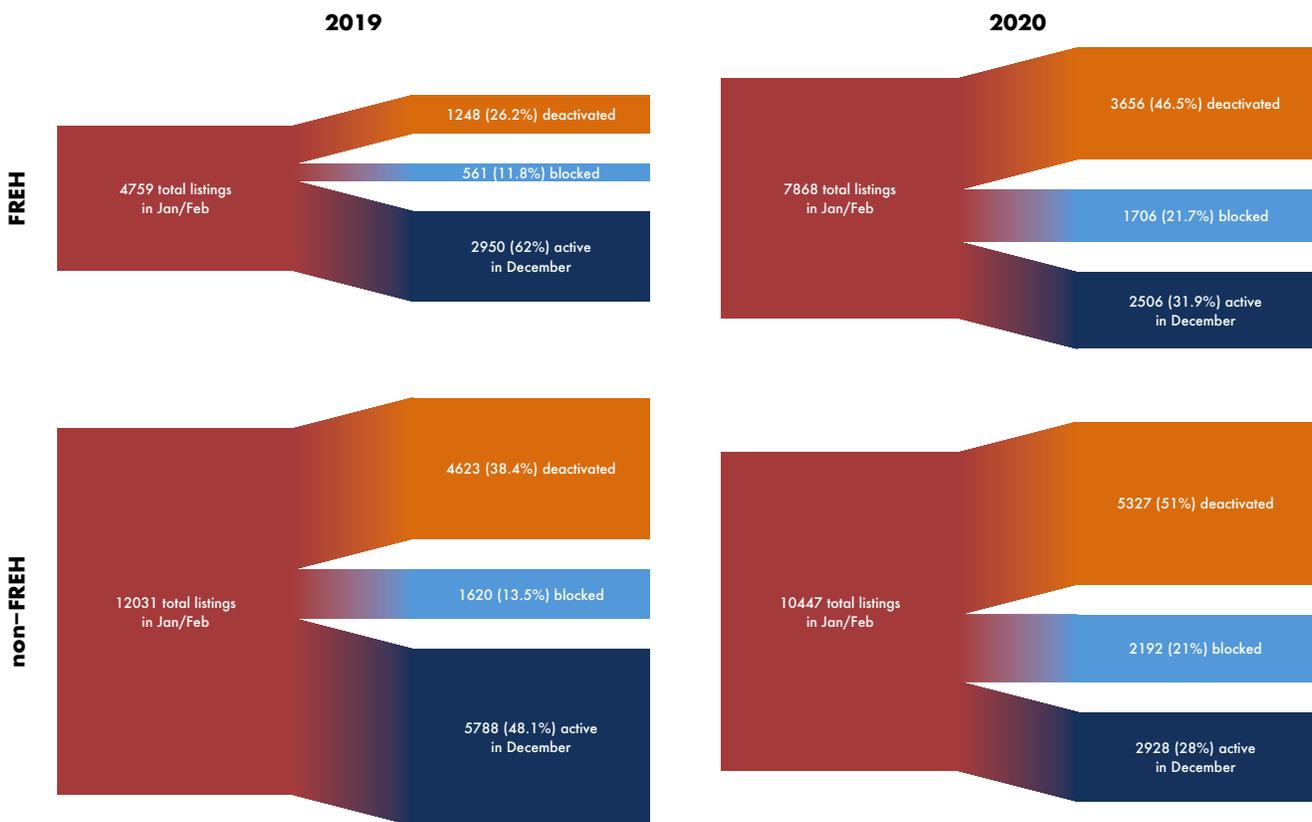

2019

FREH

4759 total listings in Jan/Feb

1248 (26.2%) deactivated
561 (11.8%) blocked
2950 (62%) active in December

non-FREH

12031 total listings in Jan/Feb

4623 (38.4%) deactivated
1620 (13.5%) blocked
5788 (48.1%) active in December

2020

7868 total listings in Jan/Feb

3656 (46.5%) deactivated
1706 (21.7%) blocked
2506 (31.9%) active in December

10447 total listings in Jan/Feb

5327 (51%) deactivated
2192 (21%) blocked
2928 (28%) active in December

Figure 10. Activity trajectories of FREH and non-FREH listings in 2019 and 2020

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Figure 11 compares the activity of the FREH and non-FREH listings which have remained active during the pandemic. The left panel shows the total reserved nights which occurred in each of these two groups. Unsurprisingly, it demonstrates that the large majority of reservations in the months prior to the pandemic occurred in these FREH properties. For example, in the month of February 2020, 55.0% of all reserved nights were booked in these FREH properties. In March 2020, reservations declined in both the FREH and non-FREH properties, but the decline is far larger in both relative and absolute terms among the FREH properties. The right panel aggregates the same data in a different fashion, showing the average number of booked nights per listing per month across the FREH and non-FREH listings. The same general pattern is observable: FREH listings receive substantially more bookings per month than non-FREH properties until March 2020, at which point both groups see their reservations decline, but the FREH listings decline much more sharply.

The conclusion is that, while the entire STR market in Toronto has suffered an unprecedented collapse during the Covid-19 pandemic, this collapse has been disproportionately concentrated among dedicated STRs which have been responsible for thousands of units of rental housing lost in the city over the past several years. This raises the possibility that some of these units many have returned to the long-term rental market—a possibility that has been noted anecdotally in cities across Canada (McSheffrey 2020). We explore this possibility systematically in the next chapter.
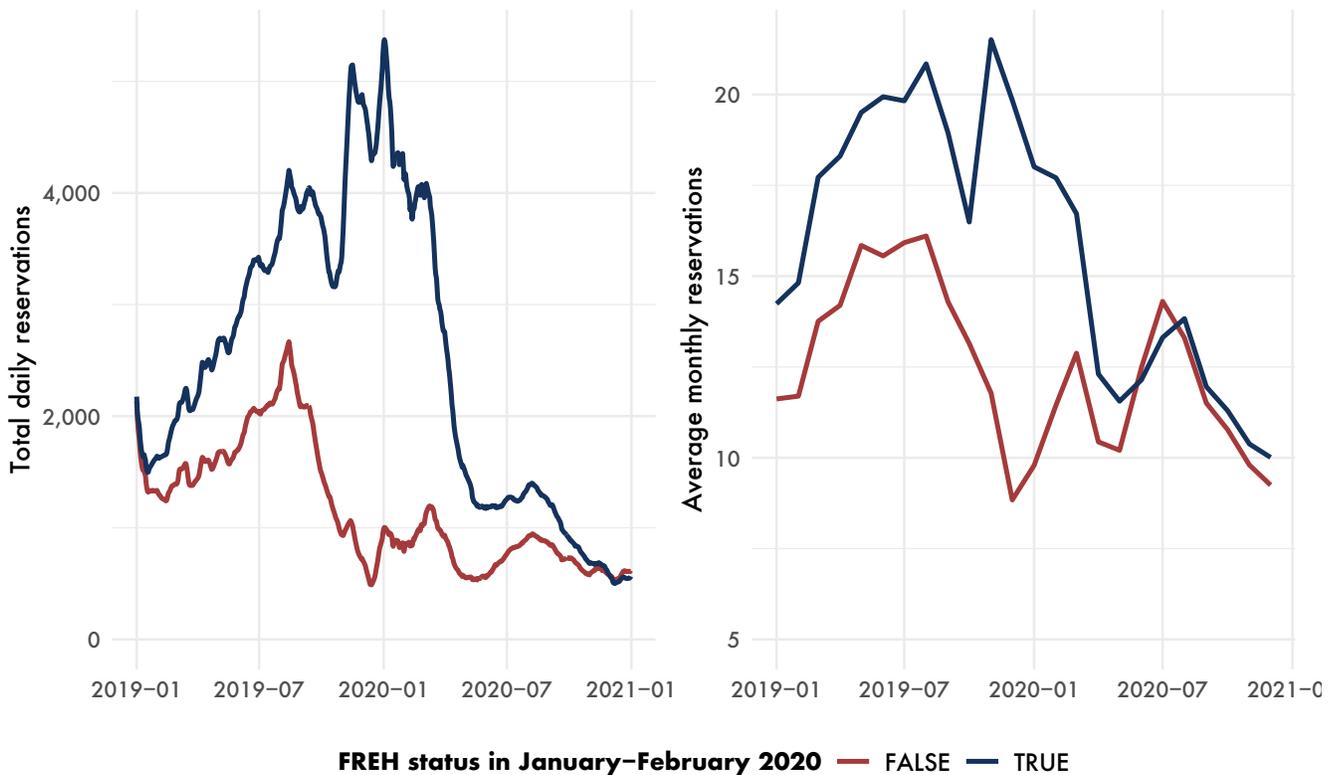

Figure 11. The total number of reservations per day (L) and the average reservations per listing per month (R), for listings which had FREH status in January or February 2020 and listings which did not (14-day average)

4. STRs returning to the long-term market

Using image recognition techniques, we identified 3,476 unique Airbnb listings which were posted as long-term rentals (LTRs) on Craigslist or Kijiji between March and December 2020. These former STRs have asking rents on average 11.6% higher than other LTR listings, but are correlated with a 12.1% decrease in overall asking rents in Toronto. The evidence suggests that the overwhelming majority of STR listings transferred to LTR platforms are commercial operations. We estimate that 42.2% have fully transitioned back to the long-term market, 23.6% have been temporarily blocked on Airbnb and may return to being STRs in the future, and 34.1% failed to be rented on LTR platforms and instead remain active on Airbnb. Of this latter figure, 22.8% have a new minimum stay of 28 nights to comply with the City's new regulations, while 11.3% continue to operate as traditional short-term rentals.

HOW MANY STR LISTINGS HAVE RETURNED TO THE LONG-TERM MARKET?

The Covid-19 pandemic has caused an unprecedented decline in STR activity in Toronto. More recently, the impending imposition of the City's STR by-law may also have contributed to a decline in STR activity. Under these circumstances, it would be reasonable to imagine that some STR hosts—particularly commercial operators who had come to expect large income streams from their properties—may have decided to return their listings to the long-term housing market, either temporarily or permanently. To investigate this possibility, we collected listing images from all

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properties posted to Craigslist and Kijiji in Toronto between April 2020 and January 2021, and used image recognition analysis to match STR listings on Airbnb and Vrbo to long-term rental (LTR) listings on Craigslist and Kijiji. These latter two platforms represent only a portion of the LTR market, but provide useful insight into how STR hosts have responded to the collapse in accommodation demand during the Covid-19 pandemic, or how they expected the regulation to impact their businesses. If the exact same photo of an apartment's living room was uploaded to Airbnb in August 2019 and then to Craigslist in April 2020, this provides proof that the property in question has moved from the STR market to the LTR market. The image recognition software we developed is able to identify matches between images which are identical, but also images which the host has modified slightly, and thus allows us

to reliably identify every match which exists between STR and LTR platforms.

Our image matching algorithm recognized 3,476 unique Airbnb listings which matched with 7,583 different LTR listings (as some units are posted multiple times) in the City of Toronto. The matching LTR listings were equally found on Kijiji (3,949 listings, or 52.1%) and Craigslist (3,634 listings, or 47.9%). Out of the 3,476 matching Airbnb listings, 59.7% (2,076 listings) were created or still active in 2020. We suspect that many or most of the remaining properties were also still active under a different listing ID and with a different photo, since commercial STRs are delisted and relisted quite frequently, and we thus consider the 3,476 Airbnb listings which we matched to Craigslist and Kijiji to be a lower bound for the number of unique housing units that

went from the STR market to the LTR market due to the Covid-19 pandemic and the expectations of the new regulation. (Each listing which we matched is guaranteed to have been listed first on Airbnb and then on either Kijiji or Craigslist, but there are certain to be additional listings which we did not match because they did not reuse the same photographs.)

All of the Craigslist listings we matched were long-term rentals. Of the 1,945 Airbnb listings we matched to Kijiji, 58.0% were identified by their hosts as "long-term rentals" and 42.0% as "short-term rentals" (a category which typically indicates month-to-month leases). Among matched Kijiji listings, 30% specified lease lengths of one year, 15% specified month-to-month, and 55% did not specify.

WHEN DID STR LISTINGS MOVE TO THE LONG-TERM MARKET?

The first Covid-19 case in Ontario was confirmed on January 25, 2020, but the pandemic did not fully erupt until the second week of March 2020, when public facilities and private businesses began to close, culminating in a Provincial declaration of public emergency on March 17. Consistent with this timeline, what was in early March a trickle of Airbnb listings moving to Craigslist or Kijiji began to accelerate in the second half of the month (Figure 12). By the end of the March, the number of daily transfers reached 64 listings. Daily numbers

remained high through April (its peak being 64 listings transferred on April 21), but even from May through December an average of 4.5 new Airbnb listings were transferred to Craigslist or Kijiji each day. It is likely, although there is no way to be sure, that the knowledge among commercial STR hosts that their listings would be illegal and subject to enforcement action when the City's STR by-law started being proactively enforced on 1 January 2021 contributed to the transfer of STR units to the long-term market in the latter months of 2020.
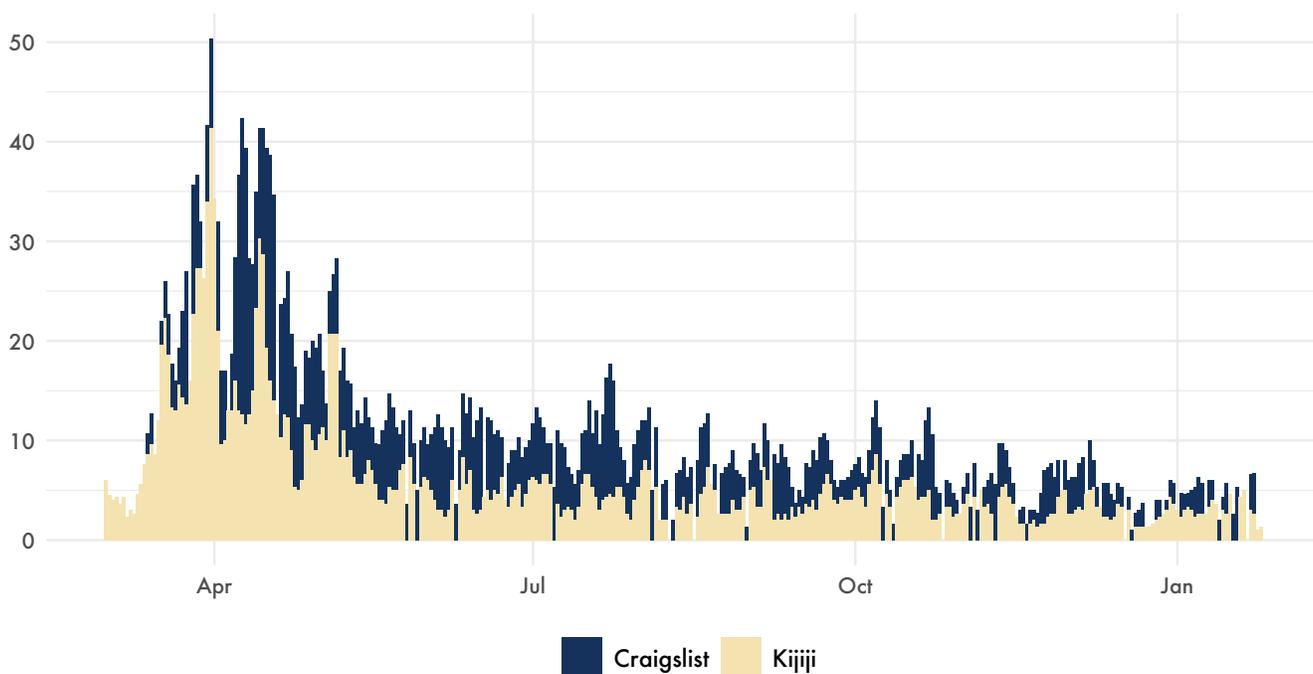

Figure 12. The date on which matched Airbnb listings were first detected on Craigslist or Kijiji in the City of Toronto (3-day average)

SPATIAL DISTRIBUTION OF MATCHED LISTINGS

Out of the 3,476 unique STR listings matched to LTR listings in the City of Toronto, nearly half (41.1%) were located in the Spadina-Fort York ward, with the remaining matches more evenly split between the other wards. 12.7% of matches were in the Toronto Centre ward, followed by 11.3% in University-Rosedale. The rest of the wards were below 6% each. Even accounting for the general concentration of STRs in Spadina- Fort York, this ward is still highly over-represented in

these matches (Figure 13). Toronto Centre is likewise over-represented. The number of STR listings matched to LTR listings in Spadina-Fort York is equivalent to more than a third (36.4%) of all the STR listings active in the ward on March 1, 2020, and more than a fifth 20.5% of all the listings active in the ward in 2020. In Toronto Centre, the matches found represent 42.6% of all active STR listings on March 1, and 20.5% of all active listings in 2020.
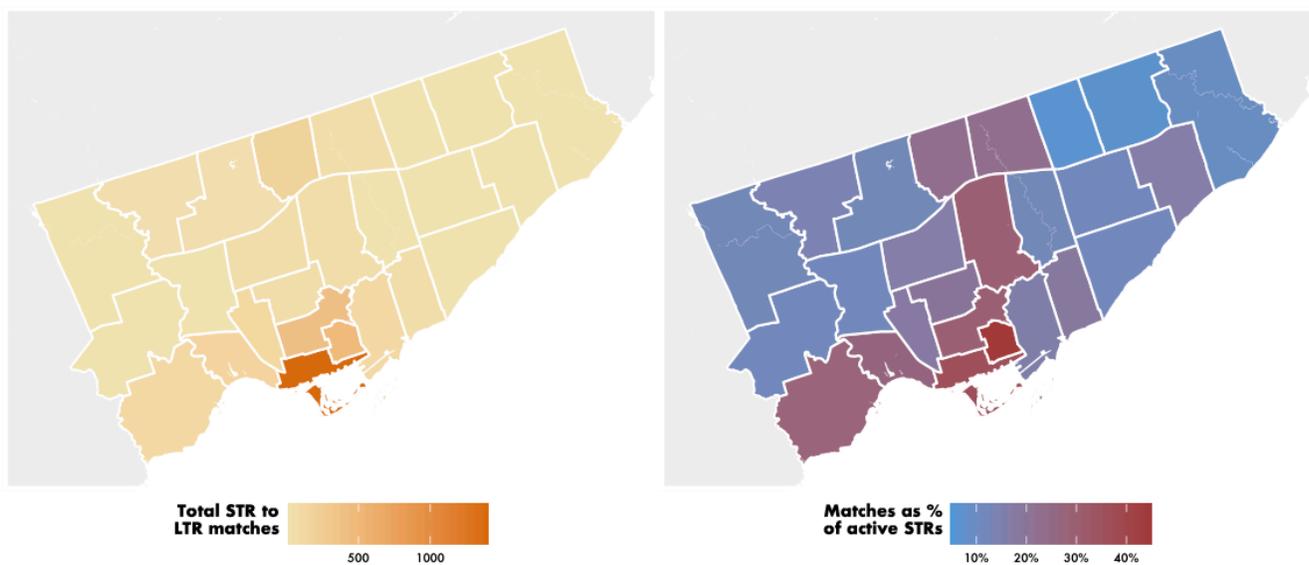

Figure 13. Total number of STR listings matched to LTR listings (L), and matched STR listings as a percentage of daily active listings on 2020-03-01 (R), by ward

ASKING RENTS

The left panel of Figure 14 shows the average asking rents of listings posted to Craigslist and Kijiji between April and December 2020. The asking rents of the STR-LTR matches have remained significantly higher than non-matched LTR listings. In April 2020, when the average asking rent on LTR platforms in the City of Toronto was $2,140, the average asking rent among listings which we matched to Airbnb was

$2,460—15.0% higher. Over the course of the spring and the rest of the year, average asking rents for LTR listings matched to Airbnb declined continuously. In December, the average asking rent was $1,910 for all Craigslist and Kijiji listings and $2,140 for the matches. Overall, from April to December, asking rents for properties matched to STR listings were 11.6% higher than listings which were not matched.
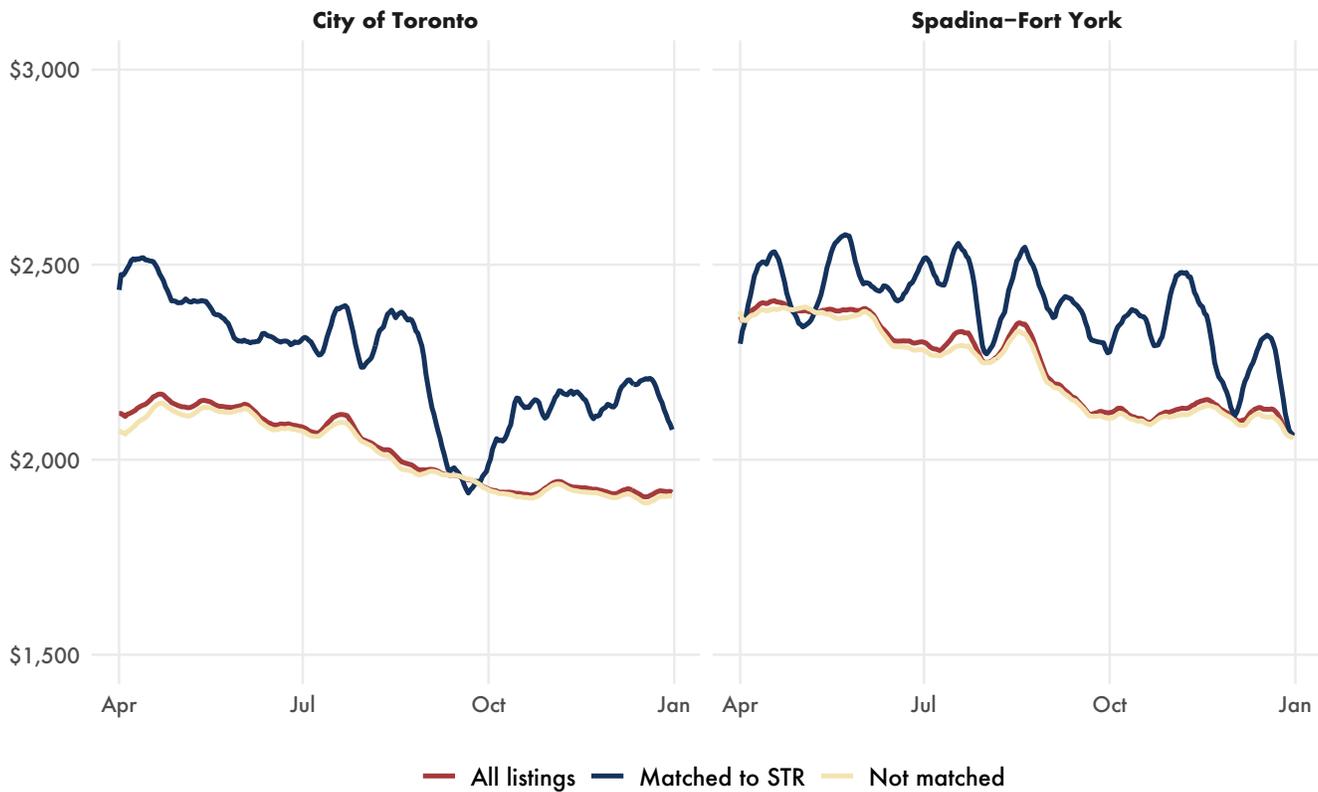
Figure 14. Asking rents on Craigslist and Kijiji in the City of Toronto (L) and Spadina-Fort York (R) (7-day average)

The right panel of Figure 14 shows asking rents only in the Spadina-Fort York ward. A large portion of the divergence in asking rents between LTR listings matched to Airbnb and listings not matched is a compositional effect of the much greater frequency of a Spadina-Fort York location (which commands higher prices than the rest of the city) among matched listings. Even in this ward, however, LTR listings matched to STRs have been on average 7.2% more expensive than listings not matched. Overall, STRs returning to the long-term market are correlated with a significant decline in asking rents. The average city-wide asking rent on Craigslist and Kijiji declined 12.1% from $2,142 in early April 2020 to $1,911 in late December 2020.

ARE MATCHED LISTINGS COMMERCIAL OPERATIONS?

Nearly all of the STR listings which we matched to LTR listings on Craigslist or Kijiji are likely to have been dedicated, commercial STRs. This is because it is highly unlikely that a casual home sharer operating a STR out of their principal residence would decide to vacate their home, list it on Craigslist or Kijiji, and reuse the photo they had used to advertise the short-term rental. It is therefore also likely that the STR listings found on LTR platform were non-compliant with the City's new STR regulation, since the fact that they were commercial operators makes it extremely difficult to also have the listing be operated out of a principal residence. We can test this intuition by examining the characteristics of the STR listings which we matched to an LTR platform.

Of the 3,476 unique STR listings that matched with the LTR market, 2,788 (80.2%) are entire-home listings and 646 (18.6%) are private-room listings. Examining the entire-home listings, 55.8% of them were identified as frequently rented entire-home (FREH) listings at some point, which means they were almost certainly operated commercially. Moreover, 38.1% of entire-home STR listings which matched to LTR listings were multilistings at some point, which means they were operated by hosts controlling multiple listings simultaneously. In total, more than two thirds (69.5%) of entire-home listings had one of these two strong indicators of commercial activity.

The 646 private-room listings require some further analysis, because each of these listings matched to a Craigslist or Kijiji listing advertised as an entire housing unit. Our analysis suggests that these listings break down into three categories. The first is miscategorizations. 122 (18.9%) of the LTR listings that matched to STR private-room listings had titles such as "1 fully furnished bedroom" or "swap". This suggests either that these listings were rooms located in the host's principal residence incorrectly listed as entire homes, or that images of the Airbnb private room listing were reused to conduct an exchange of leases between tenants. These STR listings are not commercial listings and their appearance on LTR platforms likewise does not constitute housing being returned to the market.

The second category of private-room Airbnb listings matched to entire-home LTR listings is ghost hostels

— clusters of private-room listings which may appear as a series of "spare bedrooms" on Airbnb or Vrbo but are in fact one or more housing units converted to a dedicated STR. 265 (41.0%) of the 646 private-room listings which matched to Craigslist or Kijiji belong to ghost hostels in Toronto. The remaining 259 private-room Airbnb listings which matched to Craigslist or Kijiji are likely to be ghost hostels which our algorithms failed to identify, or smaller housing units similarly subdivided into private rooms. (Our procedure for identifying ghost hostels only considers clusters of three or more private rooms, but two-bedrooms apartments can also be listed as pairs of private rooms.) On balance, the likelihood is that these listings also represent commercial STRs returning to the long-term market.

Focusing on the unambiguous case of the entire-home listings which matched between STR and LTR plat- forms, 23.6% of the commercial listings active at any point in 2020 have been transferred to Craigslist or Kijiji since March. But, given the rapidity with which individual listings are posted and removed, this significantly understates the scope of listings moving from Airbnb to the long-term market. Expressed as a percentage of the commercial listings active on March 1, 2020, at the onset of the pandemic, the matches represent 40.9% of these listings. In other words, something between a quarter and a half of Toronto's commercial short-term rentals may have shifted to the long-term rental market between March and December.

Figure 15 shows the age in years of STR listings which matched a LTR platform (left panel) and which did not match (right panel). The age distribution of matched listings is slightly skewed to the left, which means that a larger proportion of matched listings are less than a year old. By contrast, STR listings which did not match tend to be slightly older. This pattern suggests that newer commercial STR listings may have been in a weaker financial position at the onset of the pandemic, prompting their hosts to change strategies more rapidly than established hosts.
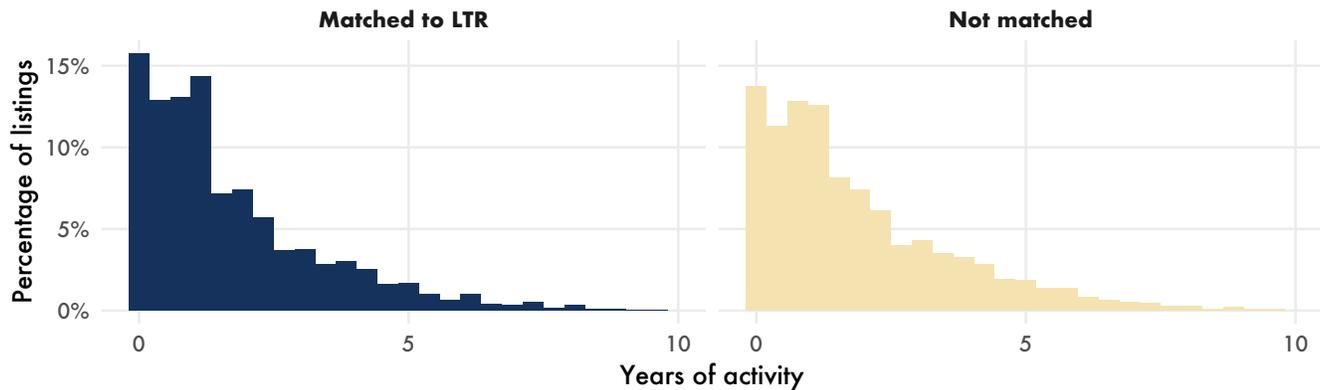

Figure 15. STR listing age distributions for listings matched to LTR listings (L) and not matched (R)

WHICH STR HOSTS TRANSFERRED THEIR LISTINGS TO CRAIGSLIST AND KIJIJI?

In Toronto, 1904 unique Airbnb and Vrbo host IDs were linked to the 3,476 STR listings which we matched to LTR listings. 419 of these hosts posted more than one of their STR units on Craigslist or Kijiji. More than two-thirds (37.3%) of the active properties of these 419 hosts were found on either Kijiji, Craigslist, or both. The fact that only a portion of the hosts' listings were found on LTR platforms suggests that the matches we have identified might be an underestimate of the total quantity of STRs that were posted on LTR platforms since the Covid-19 pandemic began. It would be intuitive to assume that a host who decides to post several of its listings on a LTR platform would post all or most of them. There are several factors which were likely at work here: some listings may have been posted, rented, and removed in between our weekly scrapes so we did not detect them; hosts may have not posted their higher-performing STR listings; and hosts may have used updated photographs for some of their listings, making it impossible to detect matches through our image matching algorithm.

STR hosts which transferred listings to the long-term rental market had substantially higher STR revenue in 2020 than hosts who did not transfer listings. The median listing revenue was $3,400 in the entire City of Toronto in 2020. The annual median revenue of hosts who transferred listings to the LTR market was $7,500, while the median revenue of hosts who did not transfer listings was somewhat less at $4,300. Moreover, many of Toronto's highest earning STR hosts turned to LTR platforms during the Covid-19 pandemic. For example, 25 of the 29 hosts that made more than $250,000 in the past year listed at least one of their STR units on an LTR platform. On average these top earning hosts listed 27.8 units on LTR platforms, compared to 1.5 units for all other hosts. Figure 16 compares the 2020 annual revenue distribution of STR hosts that

shifted listings to the long-term market and hosts that did not. Hosts whose STR listings matched to LTR listings have a revenue distribution with higher density to the right, indicating that they earned more money than hosts that did not list their STRs on LTR platforms.
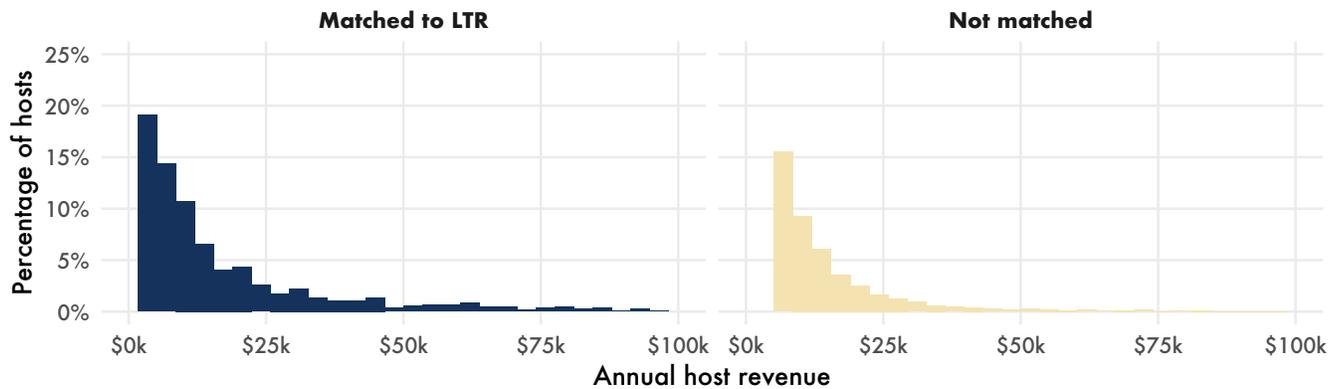

Matched to LTR | **Not matched**

Figure 16. STR host revenue distributions for hosts whose listings matched to LTR listings (L) and did not match (R)

ARE MATCHED LISTINGS SUCCESSFULLY RENTED, OR STILL ACTIVE ON AIRBNB?

The mere presence of current or former Airbnb listings on LTR platforms is no guarantee that the actual housing units have shifted back onto the long-term market. In particular, these listings might have been posted but not successfully rented. It is not possible to determine with certainty whether a given listing was rented and therefore permanently transferred from the short-term to the long-term market, but we can use two indicators to estimate this: the length of time the listing was posted on an LTR platform, and the current activity status of the listing on the STR market.

On average, the STR matches found on LTR platforms were listed for rent longer than the non-matches. STR matches were listed an average of 18.8 days on LTR platforms, while non-matches were listed only four fifths as long —15.4 days on average. This simplest plausible explanation for this disparity is the fact that listings coming from the STR market were both significantly more expensive than other listings

and much more likely to be furnished, both of which factors may have decreased their viability in the rental market. (Of the 168,985 LTR listings we analyzed, 21.5% were listed as furnished and 74.7% as unfurnished.) Figure 17 shows the distribution of the length of stay for both matches and non-matches. The figure reveals quantitatively and qualitatively different patterns among matched and non-matched listings. Most non-matched listings were present for less than a week on Craigslist or Kijiji before being removed (and presumably rented), and the number of listings still present declines relatively smoothly as the length of time increases. By contrast, most matched listings were not rented after a week, and in fact the proportion which took a month or more to be taken down is higher not lower than the proportion which were taken down after several weeks. Our conclusion is that, regardless of their host's intentions, STR units listed on LTR platforms have been relatively unsuccessful at transitioning back to long-term rentals.
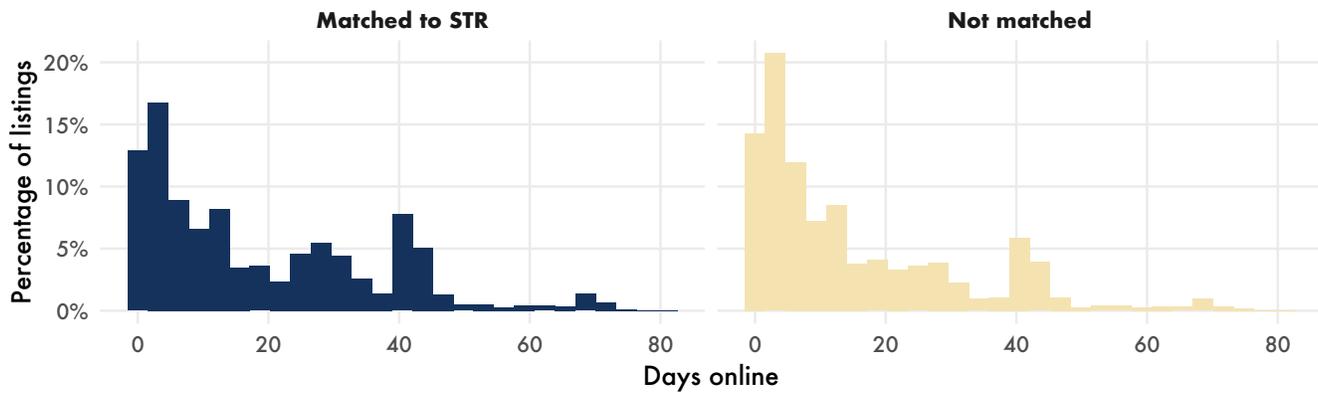
Figure 17. LTR listing posting length distributions for listings matched to STR listings (L) and not matched (R)

Further evidence about the extent to which STR hosts are successfully transferring their listings to the long-term market can be found by examining the activity of the STR listings themselves. Are hosts planning on renting on the long-term only temporarily, leaving the STR listing running for future bookings? Or have they deactivated the STR listing? Out of the total 3,476 STR listings which we identified on LTR platforms, 2284 (65.7%) were present on Airbnb or Vrbo at the beginning of 2020. Out of this number, 1,246 (54.6%) were still present on 31 December 2020, while the other 1,038 (45.4%) had been deactivated. Extrapolating this proportion across the entire set of matched listings we identified, we estimate that 1,580 matched listings have been deactivated from Airbnb or Vrbo during the pandemic, while 1,896 remain on the platforms. Listings removed from STR platforms are likely to have been durably shifted to the long-term market. However, 63.1% of these listings were rented as furnished rentals on Craigslist or Kijiji. These listings should therefore be considered at relatively high risk of returning to the STR market if demand recovers.

Listings which remain on Airbnb and Vrbo can nevertheless be inactive. If a host successfully rents their listing on Craigslist for several months, they can choose to block their calendar on their STR platform to make sure no new reservations occur, while keeping the listing intact for when the STR market recovers. Of the 1,246 matched listings present on Airbnb or Vrbo at the beginning of 2020 and still present by the end of December, 622 (49.9%) were blocked for the entirety of the month of December. This suggests that these listings are not active on the STR market and therefore have been rented on the LTR market, but the fact that the STR listings have not been taken down suggests that the hosts may plan to reactivate their units once STR demand recovers. Furthermore, 506 (40.6%) of the matched listings which failed to transfer to the LTR market have set their minimum stay at 28 days in order to remain on Airbnb but not need to register with the City.

In total, taking into account the matched listings which have continued to see activity on Airbnb, we estimate that, of the total 3,476 STR listings which were advertised on Craigslist or Kijiji, 1467 (42.2%) have been deactivated from Airbnb and Vrbo and have likely transitioned back to long-term housing (albeit often as furnished rentals which could be reconverted to STRs). 822 (23.6%) have been temporarily blocked on the STR platforms and have likely been rented in the long-term market but may return to being STRs in the future. 793 (22.8%) are still operating on Airbnb but with a 28-day minimum stay. 394 (11.3%) failed to be rented on LTR platforms and instead remain active as traditional short-term rentals (minimum stay of less than 28 days) on Airbnb.

5. STR regulatory compliance

Since the beginning of 2021, all STRs in the City of Toronto must be registered. In early January Airbnb removed 2,600 Toronto listings which had failed to do so, and converted 8,400 more to a minimum rental length of 28 days, which means they are not subject to the STR by-law. In November of 2020, only 6.3% of Toronto listings had a minimum stay of 28 days or more, while at the beginning of February 2021 it was 72.2%. 9.7% are operating with a valid registration, 7.4% use a valid registration but for multiple listings, 6.5% display no registration information, and the remainder either claim to be exempt or are using a fake registration number. FREH listings have the highest rate of valid registrations (28.8%) among listing categories. Multilistings have the highest rate of duplicate registrations (19.4%). Duplicate listings and listings operating under a fake registration number are the ones that earned the most revenue during the pandemic, while listings which have switched to minimum 28-day reservations were previously less frequently reserved than other listings.

AIRBNB'S MASS REMOVAL OF NON-REGISTERED LISTINGS

As of 1 January 2021, all STR operators in Toronto are required to be registered with the City. This means that all properties displayed on Airbnb (with the exception of properties rented exclusively for 28 days at a time or longer, and hotels and other tourist accommodations which are regulated separately) must have a registration visible on Airbnb.ca. (Vrbo, Airbnb's biggest competitor recently pulled out of the Toronto market.) By examining listing activity, registration status, and minimum stay requirements, we have identified two major developments in Toronto's STR market following the implementation of the City's regulations.

The first development is that approximately 2,600 listings were taken down from Airbnb's platform in mid-January, nearly all of which had failed to display a registration number. The most likely explanation for this is that Airbnb removed these listings en masse. The second development is that

Airbnb converted the majority of remaining, unregistered Airbnb listings in Toronto to 28-day minimum rentals, which means they are not subject to the STR by-law. The result is that relatively few listings have registered, but also relatively few listings are in violation of the regulations.

Figure 18 shows the total number of active listings that were displayed on the Airbnb platform from 1 January 2019 to 24 January 2021 (the last date for which we have complete information). It demonstrates a steady increase in displayed listings through 2019, a rapid decline of listing numbers during the Covid-19 pandemic, and then a sharp drop of more than 2,600 listings around 11 January 2021, which appears to have been a mass removal initiated by Airbnb of listings without registrations. The listings which were deactivated on this date were overwhelmingly ones which had been inactive for a year or more, suggesting that they had been abandoned by their hosts.
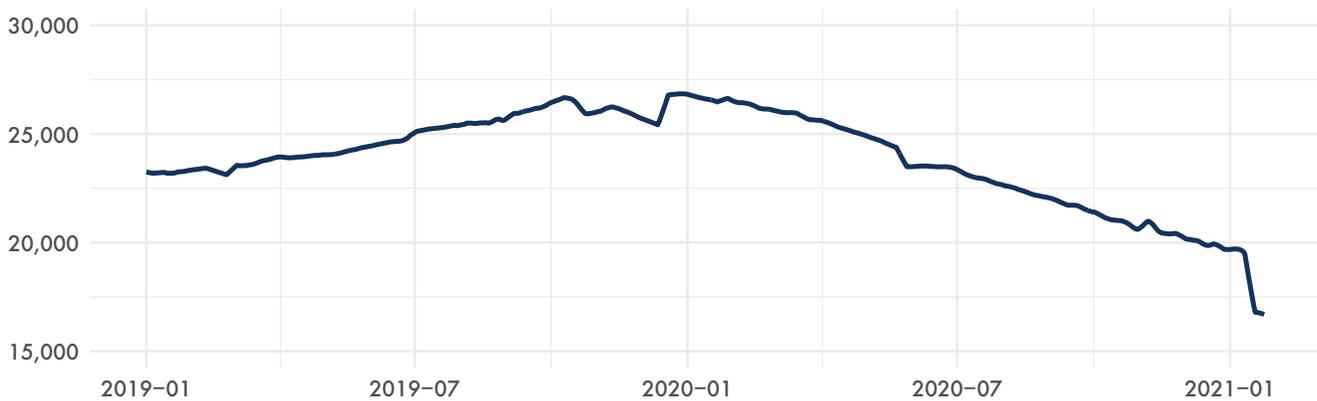

Figure 18. Displayed listings on Airbnb, 1 November 2020 - 24 January 2021 (7-day average)

THE CONVERSION OF TORONTO'S STR MARKET TO 28-DAY MINIMUM STAYS

Toronto's STR registration requirement is quite strict, and the only plausible pathway for a listing to remain operational without being registered is

for it to cease operating as a "short-term" rental, by increasing the minimum reservation length to 28 days. Prior to January, hosts choosing to rent
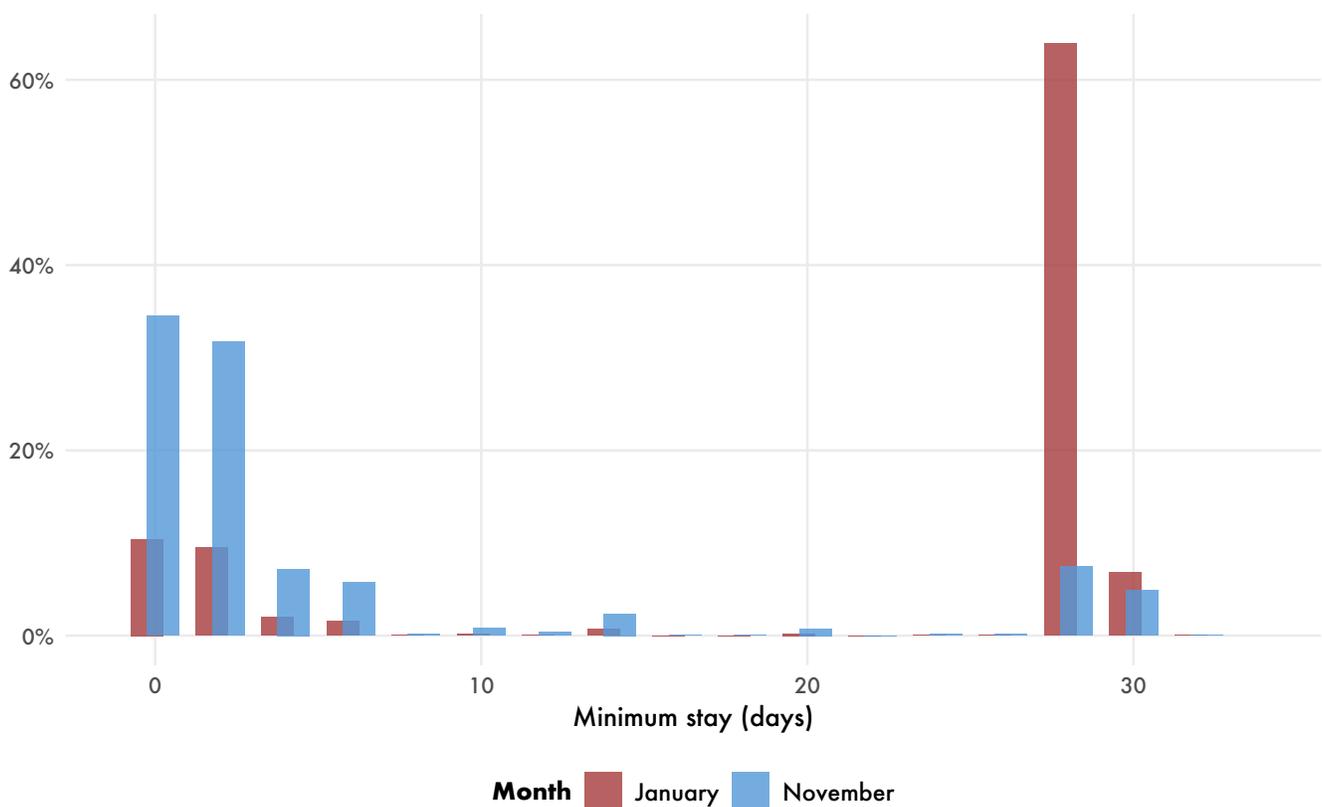
Figure 19. Listings distribution by minimum stay (in days) in November 2020 and January 2021

with long minimum stays were extremely rare on Airbnb in Toronto, since the vast majority of demand for these accommodations comes from short-term tourist stays and local parties. However, since January 1, listings on Airbnb in Toronto have undergone a dramatic and unprecedented transformation to long-term rentals.

Figure 19 displays the minimum stay length of properties in mid-November 2020 and mid-January 2021. In November, only 6.3% of listings required a minimum stay of more than 28 days. In January, this percentage rose to 74.3%, after more than 8,400 listings were switched to 28-day minimums. (Over the next several weeks this percentage declined slightly to 72.2%, as discussed on the next page.) The result is that most Airbnb listings in Toronto are now no longer operating as short-term rentals.

Both before and after this transformation, minimum stays of between 8 and 27 days were more or less non-existent, which means Toronto's Airbnb market flipped from one where nearly every listing has a minimum rental length of one week or less to one where nearly every listing has a minimum rental length of 28 days.

Given the extremely low level of STR demand due to the ongoing pandemic, these hosts might not actually be foregoing much activity by having been switched to 28 day minimums. Still, this is an unprecedented situation in our experience with STRs in Canada and elsewhere in the world, and it bears close scrutiny in the weeks and months ahead, since there is significant risk of hosts attempting to return their listings to short-term rental status if Airbnb reverts this change.

LISTING REGULATORY COMPLIANCE

Figure 20 shows the registration status of Airbnb listings active in Toronto on 5 February 2021. This follows both the mass conversion of most listings to 28-day minimums and a slow trickle of new registrations of the remaining short-term rentals. On January 7th, 1,280 listings had valid registrations—6.9% of all active listings. By February 5th, that number had increased to 1,560, or 9.7%. The number of active listings using the same valid registration number for multiple listings increased by the same rate.

Figure 21 shows the same 16,087 listings which were displayed on February 5 as the previous figure, but organized by registration status and activity status. The top row (A) organizes listings by their registration status. Most listings (72.2%) avoid the need to register by setting a minimum stay of 28 days or more reservations. 9.7% had a valid registration, 1.6% claimed to be exempt, and 7.4% had a city-issued registration, but used this registration for multiple listings at the same time. This leaves 2.6% of listings which had a fake registration number (an entry which was in the proper format but which did not correspond to an actual registration number issued by the City) and 6.5% which had no registration number at all. In total, the number of listings operating in direct defiance of the regulations is significantly

lower than other cities with similar registration systems, although we are not aware of other cities where so many listings have switched to 28-day minimum reservations. Commercial listings (either FREH listings or multilistings) are over-represented among both listings which have valid registrations and listings using a fake registration. Non-commercial and inactive listings were disproportionately likely to lack a registration number.

The bottom row (B) of Figure 21 organizes listings by their activity status on Airbnb in the month of December 2020. A majority of listings in all activity statuses have converted to 28-day minimums. FREH listings are the only category where a significant proportion (28.8%) had valid registrations, and also the category with the smallest percentage of listings requiring a minimum stay of 28 days. To be clear, all commercial operations are per se non-compliant with the City's licensing rules, since a host cannot operate a frequently rented entire-home listing or multiple entire-home listings in their principal residence. But these listings were disproportionately likely to have a registration. Only 0.3% of FREH listings were missing a registration, compared to the 7.0% of other listings which were missing a registration. It is not
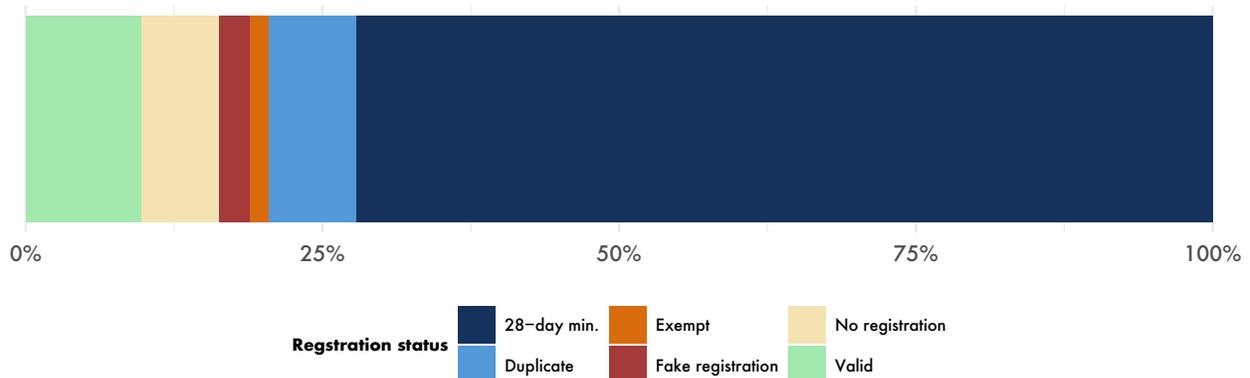

Figure 20. Total active listings on 5 February 2021 by registration status

A1

A2

Registration status   ◼ Inactive   ◼ Non–commercial   ◼ Multilisting   ◼ FREH

B1

B2

Registration status   ◼ No registration   ◼ Duplicate   ◼ Valid
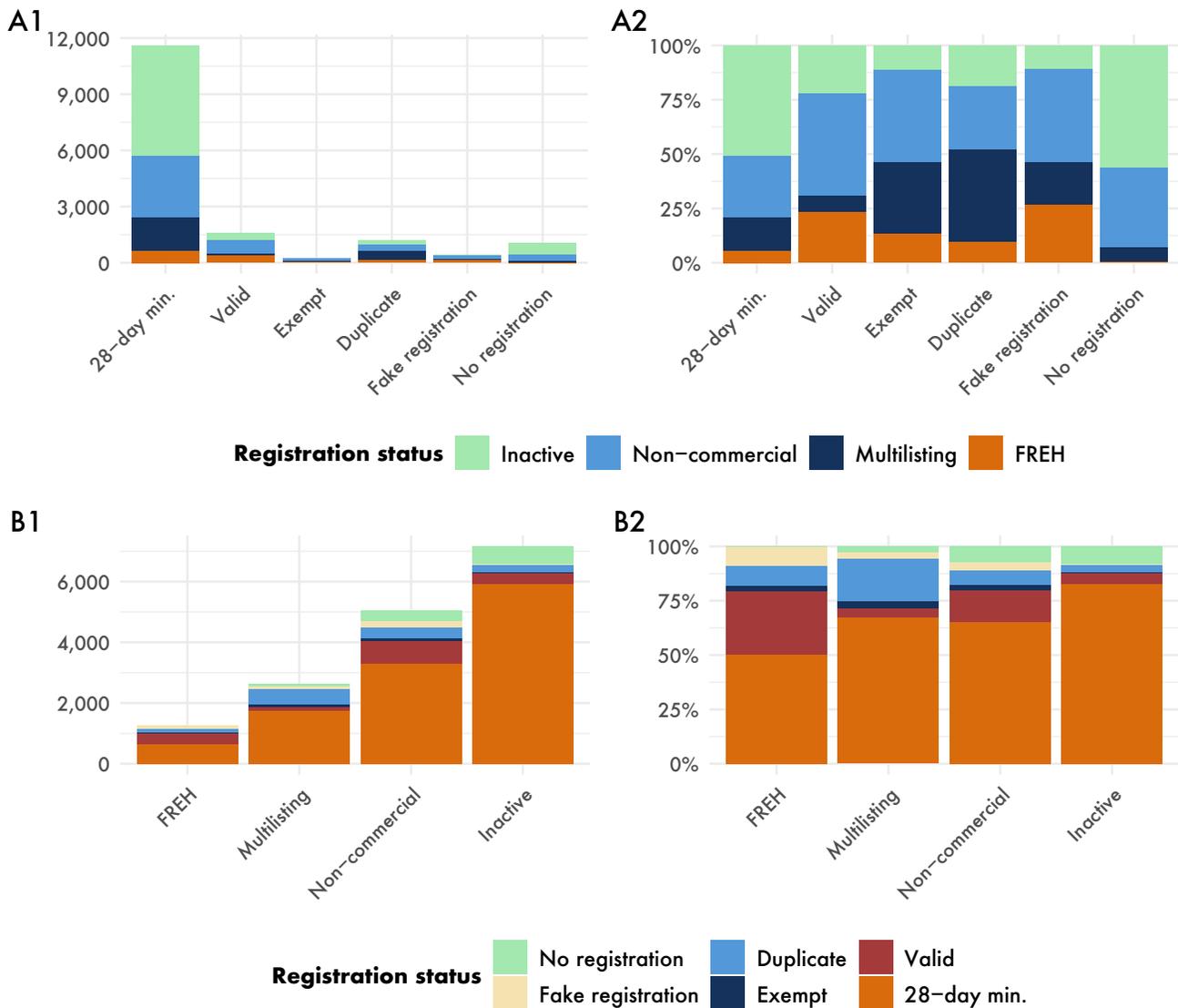   ◼ Fake registration   ◼ Exempt   ◼ 28–day min.

Figure 21. Registration status and listing status (in December 2020) for listings displayed on Airbnb on 5 February 2021

a safe assumption that listings displaying a valid number are in fact operating in conformity with the City's rules, however. 294 (80.1%) of active entire-home listings and 468 (55.6%) of active private room listings displayed a registration number which was being used by at least one other active listing. Unless these listings are duplicates of the same property, most of them must be operating in violation of the City's regulations.

DAILY ACTIVITY OF ENTIRE-HOME LISTINGS BY REGULATORY COMPLIANCE

How does registration status relate to listing activity? We analyzed reservation, availability and revenue patterns of all entire-home listings which were active in the month of December

35

License status	Number of entire-home listings	Nights available	Nights reserved	Nights blocked	Revenue per night
All listings	4,340	40.0%	25.1%	34.9%	$31
Valid registration	910	31.0%	31.5%	37.5%	$39
28-day minimum	2,670	43.4%	21.3%	35.3%	$24
Duplicate registration	350	36.8%	31.4%	31.9%	$47
Exempt	80	41.4%	33.7%	24.8%	$42
Fake registration	230	32.4%	35.0%	32.6%	$46
No registration	80	64.9%	10.6%	24.6%	$12

Table 5. STR activity since the beginning of the Covid-19 pandemic by registration status, for listings which were active in December 2020

2020 to understand the relationship between displaying a valid registration number and STR activity. Table 5 summarizes this information. Entire-home listings with valid registrations have significantly higher reservation rates (31.5%) than both listings with no displayed registrations (10.6%) and listings that switched to 28-day minimum stays (21.3%). Among listings which do not have unique valid registrations, it is listings with fake registration numbers (i.e. numbers which follow the correct STR-####-AAAAAA format but do not correspond to a number actually issued by the City) which have been reserved the most on average (35.0%). Listings that acquired registrations also earned disproportionately more revenue per night since the onset of the Covid-19 pandemic. Listings that claimed to be exempt, listings using a fake registration and listings using a valid but duplicated registration earned on average $42, $46, $47 per night, respectively.

We can thus say that listings which have been more active on Airbnb—both in terms of revenue and availability—in the past year are the ones most likely to have obtained a business registration, or to at least display some form of registration information on their listing.

The implications of this analysis are: 1) displaying a registration number is associated with greater previous success in the STR market in Toronto, and 2) it does not appear to be important whether the registration number is valid or not. STR operators which took the initiative to either get a registration number, use a valid registration number for more than one listing, or enter a fake registration number are the ones that have had more activity on Airbnb and most likely intend to continue operating on short-term rental platforms. Operators that have switched to longer-term reservations earned less revenue since the start of the pandemic, suggesting a weaker position in the STR market.

6. Bringing more STRs back to the long-term market

Relative to other listings, STR listings which transitioned to the LTR market had higher monthly revenue in 2020 but a greater decrease in year-over-year revenue. Using a multivariate linear regression model, we estimate specific reasonable monthly rents at which remaining STR hosts would plausibly shift their units to the long-term market. These rents range from $1,430 for studio apartments in low-cost areas of the city to $3,890 for 4-bedroom apartments in high-cost areas.

THE FINANCIAL PERFORMANCE OF STRS WHICH MOVED TO THE LTR MARKET

Chapter 4, above, established that some combination of the Covid-19 pandemic and the impending implementation of the City of Toronto's STR regulations have resulted in thousands of Toronto STR hosts listing their STR units on the long-term rental market. This final chapter analyzes the financial parameters underlying this decision, and develops a quantitative model to predict the monthly rents at which the hosts of existing dedicated STRs might consider converting their listings to long-term rentals, based on the listing's previous financial performance, its size, and its location.

STR listings moved to the LTR market had significant higher monthly STR revenues in 2020 compared to the STR listings that did not make the move. Non-matched listings had a median revenue (the dashed lines in the upper panel of

Figure 22) of $570, while listings that did match to the LTR market had a median revenue of $750. The difference is larger for pre-pandemic 2019 monthly income, when non-matched and matched listings had median monthly incomes respectively of $910 and $1,260. This pattern is consistent with our previous assessment that it is high-earning STR hosts who disproportionately chose to move their units to the LTR market. Moreover, while the vast majority of listings experienced a decrease in revenue from 2019 to 2020 because of the pandemic, it is the listings that moved to the long-term market which, on average, experienced larger declines, as the bottom panel in Figure 22 shows. In sum, relative to other listings, STR listings which transitioned to the LTR market had higher monthly revenue in 2020 but a greater decrease in year-over-year revenue.
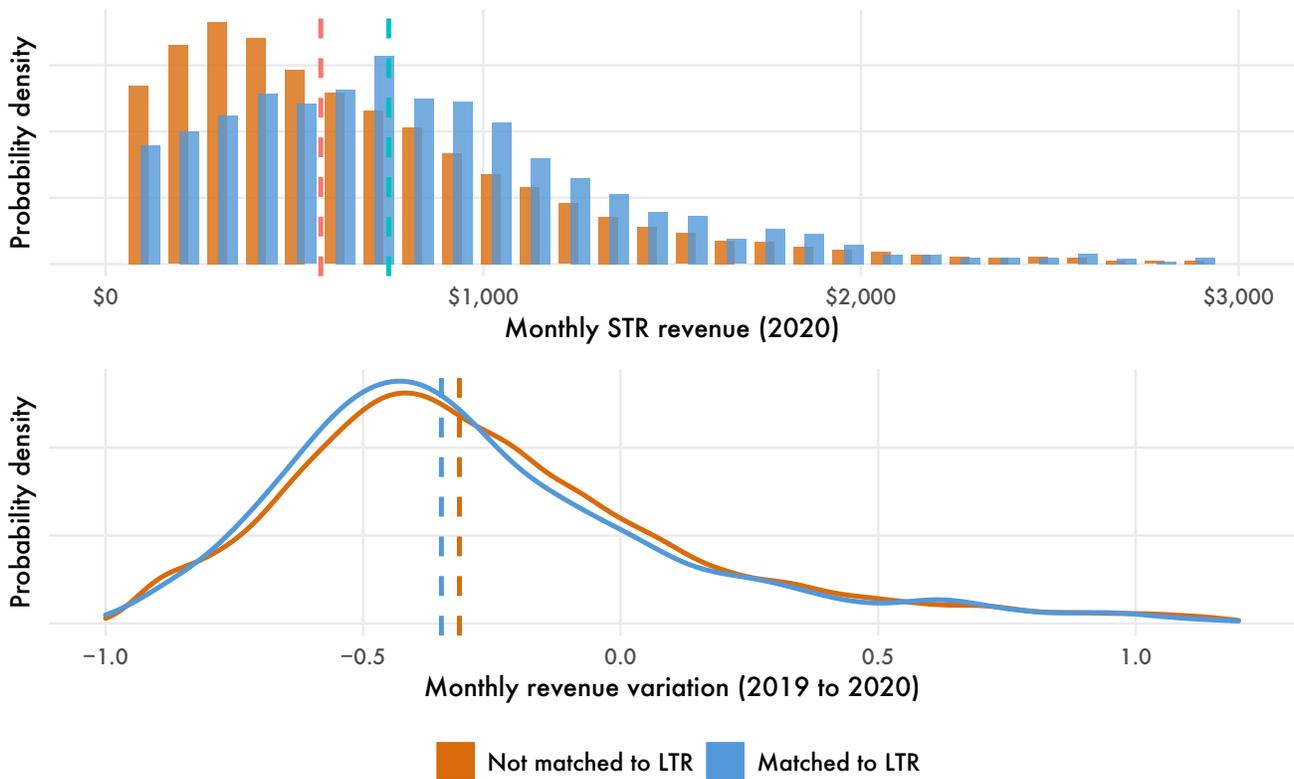
Figure 22. Monthly revenue in 2020 (top panel), and variation of monthly revenue between 2019 and 2020 (bottom panel) for matched and not matched properties

As in Chapter 4, we separate STR listings which we matched to LTR listings into four groups: listings which were permanently transferred to the long-term market and thus deactivated on Airbnb or Vrbo, listings which were at least temporarily transferred and thus blocked on Airbnb or Vrbo, listings which seem to have been unsuccessful at transferring and which are still active on Airbnb, and listings which were still active on Airbnb but were converted to 28-day minimum stays in January 2021. We further restrict our analysis to properties active at least five days during a month in 2020—a total of 1364 listings.

STR listings which matched to LTR listings but remain active on Airbnb with a minimum stay of 28 days are the listings which had the smallest monthly revenue in 2020 (a median of $724), with STR operations which remain active earning slightly more ($736; Figure 23). Taken down and blocked listings were substantially more lucrative, earning median monthly revenue in 2020 of $768 and $801 respectively.

Because of the collapse of STR demand during the Covid-19 pandemic, all four of these median monthly revenue figures are significantly lower than what a landlord could make on the LTR market in Toronto. This is an important factor in explaining the decision of STR hosts to return their units to the long-term market. Notably, however, it is the listings that did not succeed in returning their units that earned less monthly revenue in 2020, probably because they operated longer during the pandemic and into the autumn and winter, when STR revenue tends to decrease. Listings which were completely deactivated on Airbnb after
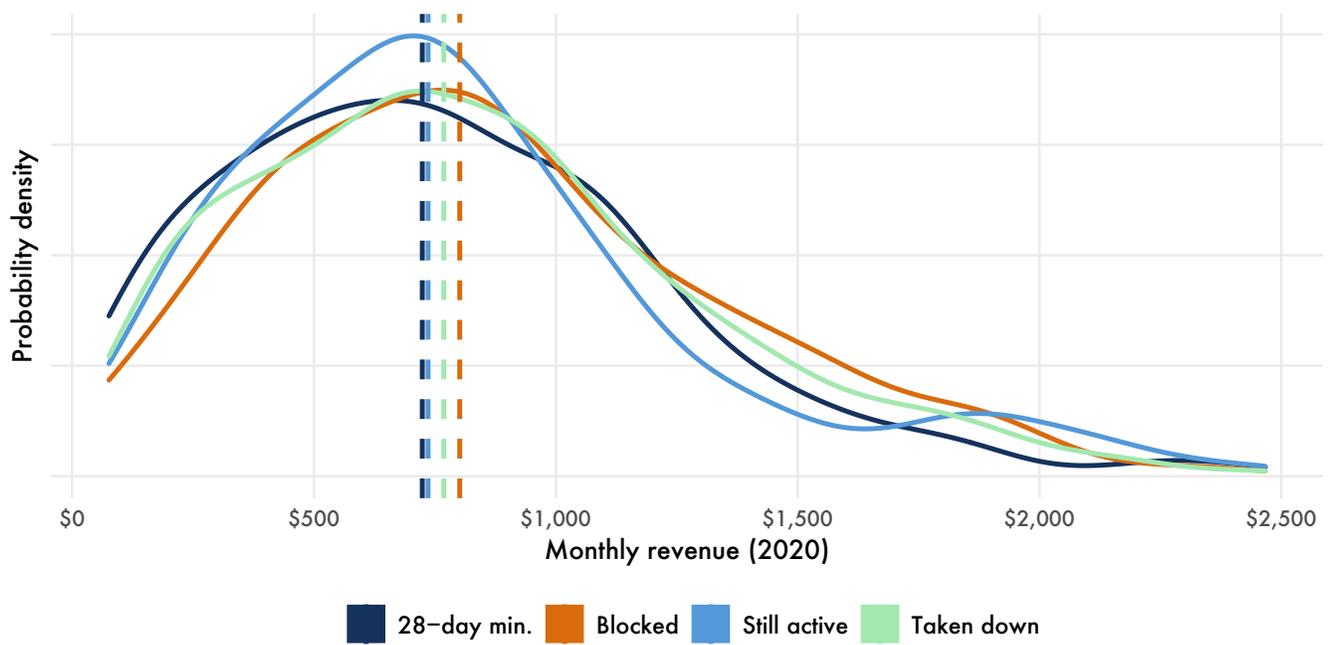
Figure 23. 2020 monthly revenue for STR listings which matched to long-term rental listings

successfully transferring to the long-term market, by contrast, are the ones that made the most monthly revenue as STRs prior to being deactivated.

A REGRESSION MODEL OF ASKING RENTS

What conditions would be necessary for the remaining dedicated STR operators in Toronto to shift their units to the long-term rental market? We can use the experience of STR listings which successfully transferred to LTRs to infer plausible asking rents for remaining STR listings. We found three data points which successfully predicted the asking rents of listings moving from the STR to the LTR market. The first is a STR listing's financial performance in 2020: the higher the STR revenue, the higher the LTR asking rent (Figure 24). The second data point is the size of the unit: the larger the number of bedrooms advertised in an STR listing, the higher the asking rent on LTR platforms. The final data point is location: the wards Spadina-Fort York, University-Rosedale, Don Valley West, Etobicoke-Lakeshore, Toronto Centre, Willowdale, and Parkdale-High Park have average asking rents above the 75th percentile for

```
=============================================
                              Asking rent
---------------------------------------------
Constant              1,264.611*** (69.363)

2020 Monthly revenue      0.271*** (0.046)

Bedrooms                464.263*** (27.189)

Geography               266.048*** (55.398)
---------------------------------------------
Observations                  1,136

R2                            0.282

Adjusted R2                   0.280

Residual Std. Error     677.277 (df = 1132)

F Statistic          147.983*** (df = 3; 1132)
=============================================
Note:                 *p<0.1; **p<0.05; ***p<0.01
```

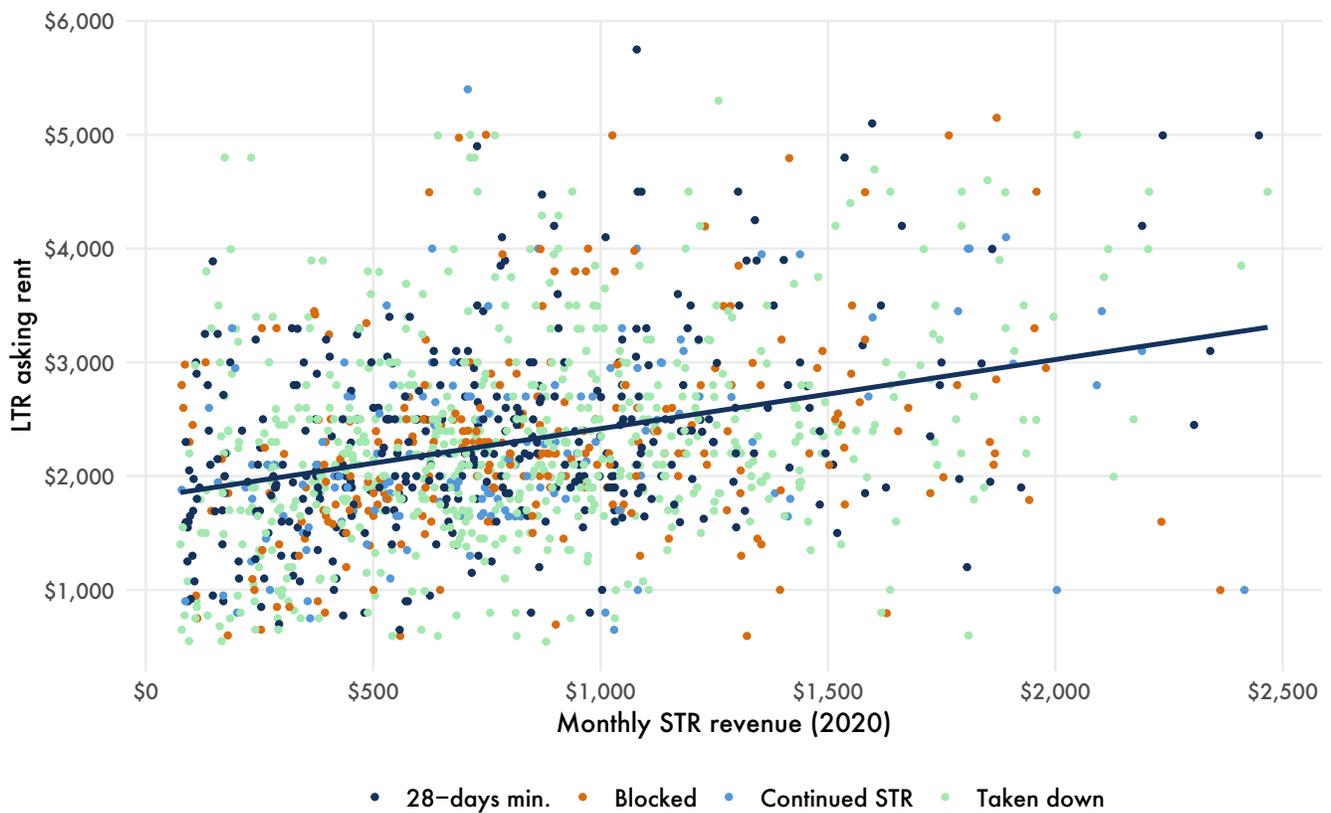*Table 6. LTR asking rent regression model for STR listings*

Figure 24. Positive relationship between monthly STR revenue and LTR asking rent

the city, and thus predict higher asking rents for STR units shifting to the long-term market.

Table 6 is the statistical model that was used to predict the rent to which a property owner would accept to move his STR property to the LTR market. The constant is $1265, which is the predicted asking rent for a studio apartment which earned $0 per month on STR platforms in 2020 and is not located in an affluent neighbourhood. Each dollar of average monthly STR revenue in 2020 increases the predicted asking rent by $0.27. Each bedroom increases the predicted asking rent by $464. Finally, if the property is located in one of the high-rent wards we identified above, the asking rent is predicted to be higher by an amount of $266.

Table 7 presents the mean asking rent predicted for each size of units and the ward category it is located (lower-cost ward vs higher-cost ward). (In

the complete model, our estimates of asking rent for all listings also depends on the financial performance of each listing.)

Number of bedrooms	Lower-cost ward	Higher-cost ward
0	$1,430	$1,720
1	$1,900	$2,220
2	$2,420	$2,760
3	$2,980	$3,340
4	$3,630	$3,890

Table 7. Mean asking rent predicted by number of bedrooms and location

Appendix. Data and methodology

The analysis in this report is based on a combination of private and public data sources. The key sources are the following:

- **Listing and activity data about Airbnb and Vrbo short-term rental listings gathered by the consulting firm AirDNA.** This data includes canonical information about every short-term rental (STR) listing on the Airbnb and Vrbo (including HomeAway) platforms which was active in the City of Toronto between January 1, 2016 and December 31, 2020. The data includes "structural" information such as the listing type (entire home, private room, shared room or hotel room), the number of bedrooms, and the approximate location of the listing. AirDNA collects this information through frequent web scrapes of the public Airbnb and Vrbo websites. The data also includes estimates of listing activity (was the listing reserved,

available, or blocked, and what was the nightly price?), which AirDNA produces by applying a machine-learning model to the publicly available calendar information of each listing. We use this data for our core analysis of the STR market, including our counts of active listings, our breakdown of different listing types, our estimates of STR-induced housing loss, and our estimates of listings which are commercial operations.

- **Additional data about Airbnb listings collected by UPGo researchers.** This includes information to verify activity, location and registration numbers, and listing photographs which were obtained through web scrapes.

- **Data about long-term rental listings on Kijiji and Craigslist.** This data includes the geographic location of listings advertised, the asking rent, the number of bedrooms, the

number of bathrooms, the title, and the photographs attached to the posting. This data was collected by UPGo through web scrapes conducted each Monday from 30 March 2020 to 1 February 2021. We use this data to analyze the long-term rental market in Toronto, and to identify STR listings which have been transferred to the long-term market.

- **Data from Statistics Canada and the Canada Mortgage and Housing Corporation (CMHC).** We use this data to analyze population and dwelling counts.

- **Short-term rental registration data from the City of Toronto's open data portal.** We use this data to analyze regulatory compliance, in order to determine the impact and effectiveness of Toronto's STR regulations.

This report analyzes the City of Toronto, and, unless otherwise specified, "Toronto" refers to the city. When other cities are compared to Toronto, we are likewise referring to the municipalities (e.g. "Montreal" refers to the City of Montreal).

Data cleaning: We process the raw STR data we receive from AirDNA through an extensive data cleaning pipeline, using our **strr** software package (Wachsmuth, 2021b), the code for which is available at https://github.com/UPGo-McGill/strr. With the Craigslist and Kijiji data we scraped, we cleaned the dataset using techniques such as string distance, duplicate removal, and outlier filtering, following similar approaches used with comparable datasets, such as Boeing and Waddell (2017) and RCLALQ (2020).

Image matching: We used our own image recognition algorithm to match listings posted both to Airbnb and to either Craigslist or Kijiji. The algorithm converts the sequence of pixels in an image into a string of numbers representing the average brightness of regions of the image, which serves as a distinctive "signature" of the image, similar to a fingerprint. We compare these signatures to each other using the Pearson correlation coefficient. When the correlation is sufficiently high, we repeat the procedure using separate signatures for the images' red, blue and green colour channels. All potential matches are then individually verified by human observation. The software package we developed to conduct this image matching is called **matchr** (Wachsmuth, 2021a) and is available at https://github.com/UPGo-McGill/matchr.

FREH modelling: We define "frequently rented entire-home listings" as entire-home STR listings which are available for a majority of the year (so 183 days or more in a 365-day period), and which are reserved at least 90 days of that year. This is a consistent and conservative way to estimate listings operated sufficiently often that they are unlikely to be their host's principal residence. But this indicator is slow to adapt to sudden shocks in STR activity, since it incorporates the past 12 months of a listing's activity. Given that both the introduction of the City's regulations and the onset of the COVID-19 pandemic caused STR activity to drop substantially, we wanted to capture the associated changes at shorter timescales than the one year which our FREH concept allows us to. So we developed a linear regression model which predicts FREH status based on three months of listing activity instead of a full year, and which is calibrated both to routine seasonal variation and to a given market's specific dynamics. All of the FREH results reported here are the results of this model rather than the raw FREH calculations themselves.

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

Glossary

Active daily listings: Listings which were displayed on the Airbnb.ca or Vrbo.ca website on a given day, and were either reserved or available for a reservation.

Commercial listings: Listings which are either dedicated STRs (frequently rented entire-home listings and ghost hostels) or multilistings.

FREH (frequently rented entire-home listings): Entire-home listings which were available on Airbnb or Vrbo a majority of the year (at least 183 nights) and were booked a minimum of 90 nights. Alongside ghost hostels, used as a proxy for long-term housing loss. For clusters of private rooms, see ghost hostel.

Ghost hostel: A cluster of private-room STR listings which may appear to be multiple spare bedrooms but are in fact an entire housing unit that has been subdivided into multiple dedicate STRs. We identify ghost hostels using a spatial analysis technique available at https://github.com/UPGo-McGill/ghost.

Listing type: One of "entire home or apartment", "private room", "shared room", or "hotel room", which an STR host chooses on

Airbnb or Vrbo to characterize their listing. Entire-home listings are the most common listing type in Toronto, and they include any STR unit that is available entirely to the guests, which could be a single-family home, a townhouse, a condominium unit, or a secondary suite.

LTR (long-term rental): In this report, a long-term rental is a housing unit available for rent for extended periods of time (generally a year), in contrast to a short-term rental. It can include monthly or yearly rental arrangements. In this report, data from the online classified ad sites Kijiji and Craigslist were used to analyze the LTR market.

Multilisting: A listing operated by a host who is simultaneously operating other listings in such a manner that the listings cannot all be located at the host's principal residence. If one host has two or more entire-home listings or three or more private-room listings active on the same day, those are multilistings.

STR (short-term rental): A housing unit available for rent for fewer than 28 days, typical of vacation rental platforms. In this report, we use STR to refer to a rental advertised on Airbnb or Vrbo.

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ABOUT UPGO

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