A Detailed Portrait of the Short-Term Rental Market in Calgary

Report prepared for the City of Calgary

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Executive Summary

In Calgary the expansion of the short-term rental (STR) market has produced wide-ranging implications for individuals, communities, and various sectors. To address those implications, the City of Calgary (The City) introduced an initial phase of STR regulations in February 2020. However, the disruption produced by the SARS-CoV-2 (COVID-19) pandemic, coupled with continued market evolution and impact of the STR regulations means that Calgary's STR market is now different from that which existed when the regulations were first designed. As Calgary looks to adopt a second comprehensive phase of STR regulations a sophisticated evidence base is needed to ensure STR regulatory approaches and processes manage negative community impacts, as well as enable The City to leverage STR activity to achieve broader economic, social, and environmental goals. This underscores the need for a full review of the STR market in Calgary that integrates recent knowledge and evidence along with stakeholder perspectives.

This report is one of several reports prepared for the City of Calgary on the STR market. In this report, we compile a detailed portrait of the STR market in Calgary based on data on Airbnb and VRBO/HomeAway listings. To ensure that we reflect the state of the market, we took several novel steps in the analysis. This included the manual inspection of STR listings and hosts to ensure they were objectively and accurately categorized. We also employ novel methodologies to differentiate between permanent versus non-permanent rentals based on actual patterns of use instead of relying on a subjective definition. Finally, we examine business license compliance, linking active listings to business administrative data, and then inspecting those links for validity. This is a more accurate assessment of compliance than crude estimates that divide the number of listings by the number of business licenses in a municipality. We end this report by estimating the number of housing units STRs are removing from the housing market in Calgary.

The main take-aways of this paper are:

SIZE	LOCATION	COMPLIANCE
The STR market has fully recovered from the COVID dip.	City Centre communities and new developing communities have more STR activity.	The majority of STR listings are compliant with business license requirements.

LISTINGS	PERMANANCY	HOUSING STOCK
Most hosts operate 1 or 2 STRs.	Most listings are only listed episodically or temporarily.	It is possible that 25% of listings could be returned to the housing market

Overall, we strove to provide an accurate reflection of the STR market in Calgary, improving on the data and methodologies that have been used in this literature. We find that Calgary has a vibrant STR market that serves a critical role during events like Stampede and provides economic opportunities to those operating STRs as well as the City. However, the STR market in Calgary is growing and there is a sizable amount of commercialization. Calgary faces other related and critical policy issues such as a lack of affordable housing and a lack of student housing. Now is an opportune time to examine the STR market and grapple with what role it should play in the housing market and the accommodation market using thoughtful and intentioned regulations.

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1.   Introduction

In Calgary, as is the case around the world, the expansion of the short-term rental (STR) market has produced wide-ranging implications for individuals, communities, and various sectors. To address those implications, the City of Calgary (The City) introduced an initial phase of STR regulations in February 2020. However, the disruption produced by the SARS-CoV-2 (COVID-19) pandemic, coupled with continued market evolution and impact of the STR regulations means that Calgary's STR economy is now different from that which existed when the regulations were first designed. As Calgary looks to implement revised STR regulations in January 2024 as well as consider a comprehensive suite of flexible regulatory measures, a sophisticated evidence base is necessary to ensure new approaches and processes both manage negative community impacts, as well as enable The City to leverage STR activity to achieve broader economic, social, and environmental goals. This underscores the need for a full review of the STR market in Calgary that integrates recent knowledge and evidence along with stakeholder perspectives, including those of STR hosts, housing advocates, the hotel industry, and residents.

In this report, we provide an extensive, evidence-based picture of the STR market in Calgary as of Summer 2023. This is the second report in a series of reports that assesses patterns and trends in the Calgary STR market. In the first report, we reviewed the current STR regulations in Calgary, and, using Airbnb data from June 2017 to June 2021, we assessed patterns and trends in the Calgary STR market to get a sense of the size and trajectory of the market, as well as understand who the hosts are, and what guests are looking for. In this report, we extend that data analysis up to and including July 2023. Future reports will gather and consider stakeholder perspectives, look at the role of STRs withing Calgary's regulatory environment, and provide regulatory recommendations.

In 2018, an STR scoping review report was commissioned by The City and the initial regulations (implemented in February 2020) were based on that report. However, recognizing that the landscape of the STR market has changed and STRs continue to have an evolving impact on the hotel industry, local communities, and city services—representing both an opportunity and cause for concern— in June 2022, Council approved a Notice of Motion directing Administration to review and revise STR business license requirements. In May 2023, Administration proposed changes to the STR bylaws that will increase protection for guests, particularly fire safety. Fire safety became top of minds of municipalities across Canada following the fatal fire in an Old Montreal building where a number of illegal Airbnbs were operating. The proposed changes were accepted by council in June 2023 and will be effective in January 2024. These changes were proposed as interim measures as this in-depth review of the STR market is ongoing.

As stated in Tedds et al. (2021), the STR market is complex and the activity that unfolds within it is diverse (p. 5). Unlike typical regulated markets, there are three actors in an STR market: hosts, guests, and the platform, all with different motivations for participation. From a policy perspective, the differing motivations of actors layered with various municipal polices—including zoning regulations, municipal development plans, and affordable housing initiatives—pose challenges to regulating the STR market. Applying standard regulatory responses in the face of these challenges can create "regulatory fractures"— when existing regulatory frameworks apply to a new mode of activity in an incomplete fashion (Tedds et

al. 2021). The overall objective of this project is to assemble a thorough evidence base to create a flexible regulatory framework that addresses regulatory fractures specifically for the City of Calgary, its unique STR market, and considers the impact of the STR market on related markets and concerns (e.g., hotel industry, LTR's, community impact).

In this paper, we compiled a detailed portrait of the STR market in Calgary based on data on Airbnb and VRBO/HomeAway listings. To ensure that we reflect the state of the market to the best of our ability, we undertook several novel steps in the analysis. This included the manual inspection of STR listings and hosts to ensure they were objectively and accurately categorized (e.g., as private rooms vs. entire home/apartments), and we included new categories (e.g., basement suites) to ensure the data more closely reflects what is actually happening in the market. We also employed novel methodologies, such as a cluster analysis to find permanent rentals, which uses an algorithm to define permanent listings based on actual patterns of use instead of relying on a subjective definition often employed in the literature. Finally, to the best of our knowledge, we are the first jurisdictional report to examine business license compliance in a careful and thorough manner, linking active listings to business administrative data, and then inspecting those links for validity. This is a more accurate assessment of compliance than crude estimates that divide the number of listings by the number of business licenses in a municipality. Overall, we strove to provide an accurate reflection of the STR market in Calgary, improving on the data and methodologies that have been used in this literature.

The main take-aways of this paper are:

- While the COVID-19 pandemic interrupted the STR market in Calgary, since late 2022 the STR market has rebounded and is growing at pre-COVID rates.
- Some communities have more STR activity (e.g., active listings, nightly bookings, and market growth) than other communities. These include centre communities such as the Beltline, Crescent Heights, and Sunnyside, and developing communities such as Seton, Livingston, and Cornerstone.
- STR activity across communities differs. Centre communities are more likely to have apartment listings and more STR-related complaints, while developing communities are more likely to have basement suites and less STR-related complaints.
- The majority of STR listings in Calgary are compliant with business license requirements (70%)— they have a valid business license number, it is posted in their STR listing, and it is not used across multiple, unrelated STR listings.
- Most STR hosts in Calgary are individuals who operate fewer than two listings on average. A small number of hosts are property managers, operating listings for property owners, and they control a disproportionately large share of the market.
- There is also a small number of hosts who are multi-listing hosts (12%). They are the most likely to be purchasing property for the sole purpose of operating it as an STR, and they control a disproportionately large share of the Calgary STR market (52% of the total revenue).
- Most STR listings in Calgary are non-permanent listings (~79% in July 2022). A small number of listings are permanent listings (~21% in July 2022) and are the least likely to be used as a permanent residence, removing housing from the housing market.
- In total, we estimate that about 1,580 (27%) STR listings in July 2023 were listings that could potentially to be returned to the housing market if STRs were hypothetically banned (i.e., they are not used as a permanent residence but are dedicated STRs). This represents about 0.29% of private dwellings. The Beltline had the highest number of these dedicated STRs by far.

Overall, we find that Calgary has a vibrant STR market that serves a critical role during events like Stampede and provides economic opportunities to those operating STRs as well as the City. However, the STR market in Calgary is growing and there is a sizable amount of commercialization. Calgary faces other related and critical policy issues such as a lack of affordable housing and a lack of student housing. Now is an opportune time to examine the STR market and grapple with what role it should play in the housing market and the accommodation market using thoughtful and intentioned regulations.

2. Data

As short-term rental platforms do not share their data, for this report, we use proprietary data purchased from AirDNA. (AirDNA n.d.).[1] AirDNA scrapes data on STRs listed on Airbnb and VRBO/HomeAway. This scraped data includes two linkable data sets: the "property" data set that contains information on the characteristics of the listing itself (as reported by the host) such as the property type (e.g., apartment), listing type (e.g., entire apartment or single room), the number of bedrooms, and the published nightly fee. In the more recent data, (April 2023 – July 2023), the property data set also contains a business license number if an STR listings includes on in its listing. The second data set is the "monthly" data set. It contains monthly transaction data for each listing that includes the number of bookings per month, the number of days available in a month, the occupancy rate, and the monthly revenue. Unlike the property data, the transaction data has had to be estimated by AirDNA from 2015 onwards as Airbnb and VRBO/HomeAway does not provide information on bookings. AirDNA uses machine learning algorithms based on an enormous historical dataset to perform the estimations. This introduces uncertainty; however, Calgary's STR market is somewhat large so the number of observations in the historical dataset reduces the uncertainty. Outside of data supplied directly from STR platforms, we believe that this is the best available data set on the STR market.[2] We use AirDNA data spanning from January 2017 until July 2023—a period of six years, spanning before, during, and after the COVID-19 pandemic. Finally, it should be noted that if an Airbnb and VRBO/HomeAway listing share a calendar and are fundamentally the same listing, they are combined into a single STR listing by AirDNA. This avoids double-counting of identical STR listings.

The data provided by AirDNA is raw data that must be reviewed and properly prepared for analysis. To this end, we undertook several data cleaning steps which are novel in this space. That is, while other research examines the data from AirDNA, they assume that what has been scraped is the "truth". However, when one begins manually inspecting the scraped data, it becomes clear that there are deficiencies in the scraped data that require correcting for a more accurate picture of the STR market. First, some listings are posted by traditional tourist accommodations such as hotels, motels, lodges, inns, and hostels. While these may be listed on STR sites, they are not what we consider as STRs, which are accommodations that are in or on a property that could otherwise be used for residential purposes. Thus, we manually checked all hosts and listings in our data to ensure that traditional tourist accommodations were excluded from the analysis.

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[1] The terms of the agreement with AirDNA are such that AirDNA retains intellectual property rights over the raw data transferred. The raw data were provided to the authors for the purpose of statistical and research purposes and cannot be republished or disclosed to a third party without the written consent of AirDNA.

[2] This data is also widely used by other authors looking at STRs in Canada and/or the effects of STR regulation. See for examples: Combs, Kerrigan, and Wachsmuth (2020); DiNatale, Lewis, and Parker (2018).

Second, to get a better understanding of hosts, we manually inspected every host in our data. We categorized hosts into several categories including property managers, corporate hosts, and individual hosts.[3]

Third, since hosts personally choose how to describe their STR listing, this results in similar words being used to describe dissimilar listings. For example, suppose a host has listed a bedroom, bathroom, and living/rec room in their basement of a single detached house as their STR listing (where the host lives upstairs). Some hosts may refer to this as a "private room" in a residential house while other hosts may list it as an "entire house/apartment" in a residential house. To standardize listing characteristics, we manually checked listings in our data for April 2023 – July 2023 and re-categorized the listing type (e.g., private room versus entire home/apartment) and property type (e.g., apartment, house, etc.).[4] Together, these data cleaning steps allows us to provide a more accurate picture of the STR market.

Two other features of the AirDNA data of which to be aware. First, listings are more proliferate than then number of private dwellings/properties used as an STR. Some hosts have multiple listings for the same private dwelling. For example, a host may have one listing for an entire single detached house, plus separate listings for separate rooms in the same house, plus separate listings for the upstairs and downstairs. Another common example is one host separately listing various rooms in one private dwelling. In both examples, there is only one private dwelling. This issue cannot be resolved with precision and must be borne in mind in the interpretation of results.

Second, some hosts use Airbnb not to list STR's but to list dwellings that they intend to rent for more than 28 days (an LTR). While it is unclear the proportion of listings that are used in this manner, it may be problematic: it may allow landlords to avoid provisions under the Residential Tenancies Act.[5] In our data analysis we assume all listings are for STRs (less than 28 days), but this may not be the case (and should be a consideration in STR regulations, a topic we will address in a future phases of this project).

Data Summary

- Includes all Airbnb and VRBO/HomeAway listings in Calgary and Edmonton from January 2017 – July 2023.
- Listings are scraped by AirDNA who then uses a machine learning algorithm to estimate bookings and revenue per listing.
- We manually inspected all Airbnb and VRBO/HomeAway listings in Calgary present in the AirDNA data to manually categorize host type (e.g., individual vs. property manager) and listing type (e.g., private room vs. entire home/apartment vs. entire suite) — a novel approach to the data.
- All traditional tourist accommodations (e.g., hotel room) have been removed.
- STR listings ≠ private dwellings used as an STR.

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[3] For a more detailed explanation on host types, see the section on Hosts.
[4] For a more detailed explanation of how we categorized property types and listing types, see the section on listing type.
[5] While it is unknown whether this is an issue in Calgary, there is at least one Toronto case where it is being argued whether a long-term Airbnb rental is protected by the Rental Tenancy Agreement (Arsenych 2023).

3. Supply Side: A Detailed Portrait of Airbnb and VRBO/HomeAway Listings

In this section, we look in-depth at the supply side of the STR market in Calgary (with comparison to Edmonton as a reference). We look at: growth in Airbnb and VRBO/HomeAway listings over time and how COVID has affected that growth, the breakdown of Airbnb and VRBO/HomeAway listings into various listing types, and a spatial analysis of Airbnb and VRBO/HomeAway listings.

3.1 Airbnb and VRBO/HomeAway Listings Over Time

Since Calgary's first STR regulations were introduced in February 2020, the STR market was altered by the COVID-19 pandemic. While the COVID-19 pandemic interrupted the growth of Airbnb and VRBO/HomeAway listings in Calgary, Airbnb and VRBO/HomeAway listings in Calgary have been growing at a rate similar to pre-COVID, leading to a higher overall number of Airbnb and VRBO/HomeAway listings.

As of July 2023, there were 5,698 active Airbnb and VRBO/HomeAway listings[6] in the City of Calgary.[7] Figure 1 plots the number of active Airbnb and VRBO/HomeAway listings in Calgary (left panel) and Edmonton (right panel) between January 2017 and June 2023.[8] The black line shows total active Airbnb and VRBO/HomeAway listings, the blue line shows active Airbnb and VRBO/HomeAway listings that are self-described by hosts as an "entire home/apartment", and the red line shows active Airbnb and VRBO/HomeAway listings that are self-described by hosts as "private rooms".[9,10]

Figure 1 shows that there are clear seasonal trends in Airbnb and VRBO/HomeAway active listings in Calgary. Prior to the COVID-19 pandemic, large "spikes" in active listings in Calgary occur in the month of July—the month when Calgary hosts the Calgary Stampede, a large outdoor rodeo and fair—with smaller spikes occurring in December around the Christmas holidays. The Stampede spike persisted during the COVID pandemic even when Stampede was cancelled (e.g., July 2020). Edmonton displays similar seasonal trends, with spikes occurring in August during Capital Ex (previously called K-Days and Klondike Days) and December holidays; however, the summer spike are less pronounced than in Calgary as Capital Ex is not as large a tourist draw as Stampede.

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[6] Note that prior to June 2020, VRBO listings were called "HomeAway" listings. Both VRBO and HomeAway are owned by Expedia. Expedia retired HomeAway in June 2020 and re-branded as VRBO to streamline their vacation rentals across countries.

[7] "Active" listings refers to Airbnb and VRBO/HomeAway listings that are available to be booked for rental (whether or not they were booked).

[8] When additional data becomes available, we will update these results.

[9] Note that active listings self-described as "shared rooms" are not shown as they make up less than 1% of active listings.

[10] As we will show, these self-described listing types are not standardized. We standardize them based on manual inspections for April 2023 – June 2023 and present the results below.

Figure 1: Active Airbnb and VRBO/HomeAway Listings, Calgary and Edmonton, January 2017 - July 2023
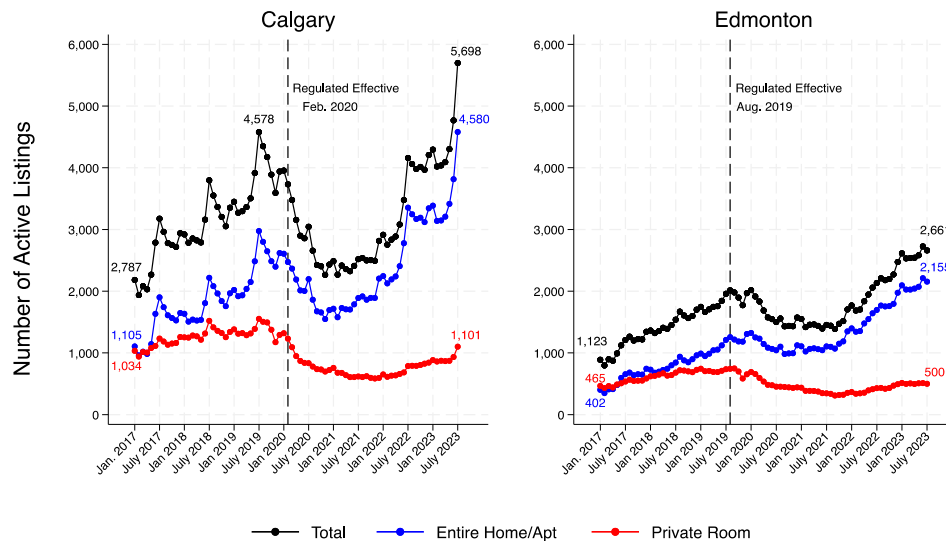

Figure 1 also shows that, over the time period examined, the number of active listings in both cities has increased, but this increase has not been consistent. Active Airbnb and VRBO/HomeAway listings declined in both cities beginning in early 2020 at the onset of the COVID-19 pandemic. Both began to recover in winter 2021. Edmonton's active Airbnb and VRBO/HomeAway listings recovered beyond pre-pandemic numbers as of June 2022, while Calgary's active Airbnb and VRBO/HomeAway listings surpassed pre-pandemic active listings as of October 2022: Calgary's STR active listings were four months slower to recover than Edmonton's.

Finally, Figure 1 shows the majority of active Airbnb and VRBO/HomeAway listings in Calgary (and Edmonton) are self-described "entire home/apartments". Self-described "entire home/apartments" listings have grown at a much faster rate than self-described "private room" listings. Particularly, post-COVID, private room listings have slowed their growth in Calgary and stagnated in Edmonton, and neither city's private room listings have reached pre-pandemic levels.

To get a better understanding of whether and how the COVID pandemic affected the STR market in Calgary, in Figure 2 we plot the growth in active Airbnb and VRBO/HomeAway listings year-over-year. The first panel of Figure 2 only includes pre-pandemic years, 2017 to 2019. Each additional panel introduces one additional post-pandemic year until all years are shown (2017 to 2023). This allows us to examine the number of active listings for each year in isolation.

In the top left panel, we see that from 2017 to 2019, active Airbnb and VRBO/HomeAway listings in Calgary grew steadily from 2,183 listings in January 2017 to 3,946 listings in December 2019 — an 81% increase in active listings. However, when the pandemic hit in March 2020, we see from the top right figure, active Airbnb and VRBO/HomeAway listings in Calgary declined to below 2017 levels. They remained below 2017 levels throughout all of 2021 (middle left panel) until January 2022 (middle right panel). In October 2022, the number of active Airbnb and VRBO/HomeAway active listings finally surpassed 2019 active listings. Since October 2022, active Airbnb and VRBO/HomeAway listings have

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continued to grow. As the bottom right panel shows, the number of active listings in July 2023 was up over 1,000 listings (24%) from the number of active listings in June 2019. This suggests that Airbnb and VRBO/HomeAway listings are once again on a steadily increasing growth path in Calgary despite being interrupted by the pandemic.

Figure 2: Active Airbnb and VRBO/HomeAway Listings, Calgary, Year-Over-Year, January 2017 - July 2023
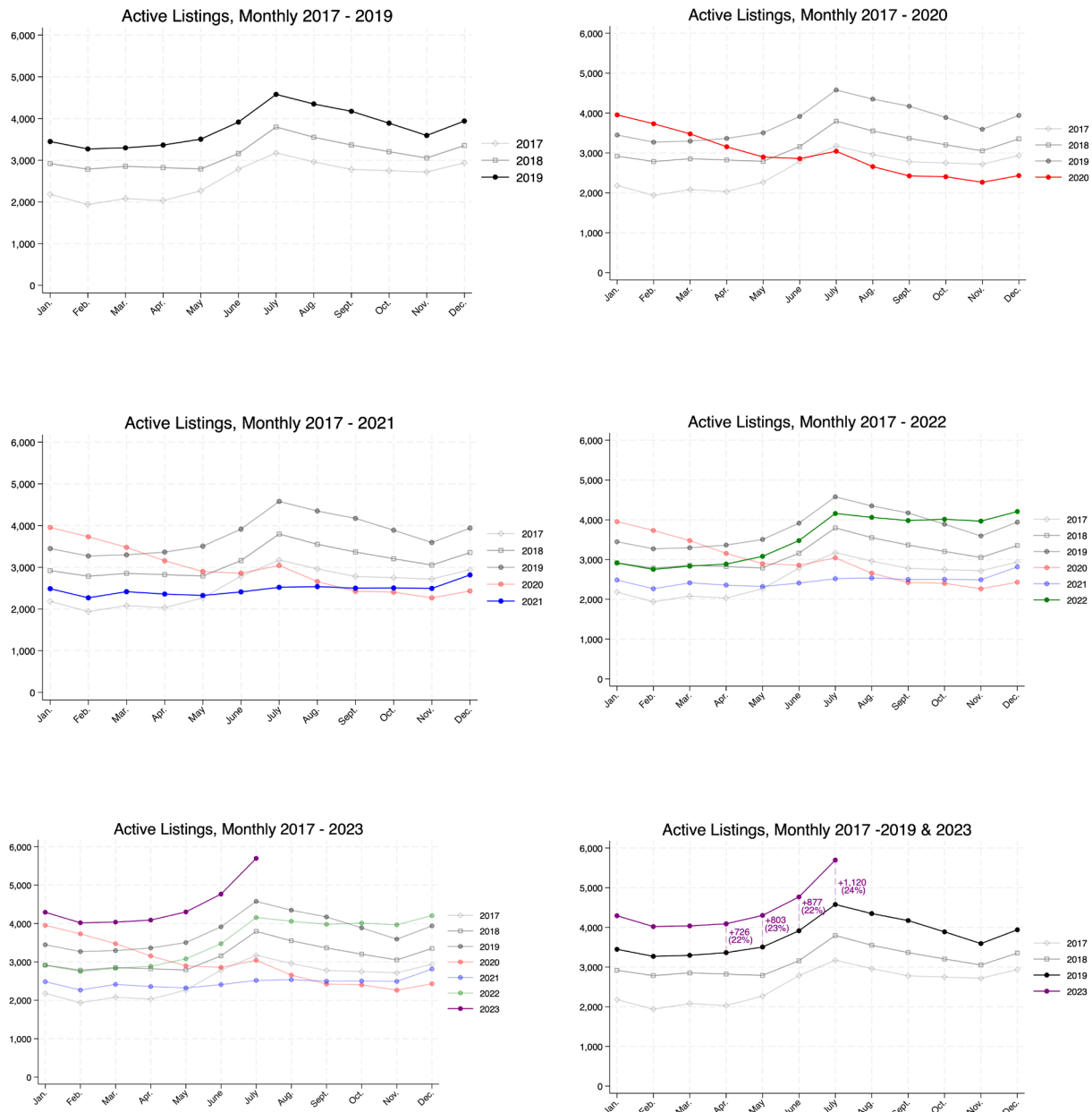
3.2 Listing Type

Airbnb and VRBO/HomeAway allows hosts to choose their own listing type. They must choose one of the following: entire home/apartment, private room, hotel room, or shared room. While Airbnb does provide a suggested definition of these (e.g., Airbnb 2023), allowing hosts to choose their own listing types results in inconsistency across listings as hosts apply their own interpretations. For example, as we will see, basement suites are a common STR type in Calgary. However, when the entrance to a basement suite STR listing is shared, some hosts refer to such a listing as an entire home/apartment, while others label it a private room. In Figure 1, we saw that self-described "entire home/apartment" listings have been driving STR growth in Calgary. In this section, we nuance this result, and manually check and standardize listing types. This provides a better understanding of the STR market in Calgary.

As suggested, to carry out this analysis, we manually re-categorized the listing type of all Airbnb and VRBO/HomeAway listings in Calgary from April 2023 to July 2023.[11] We conceptualize "listing type" as a description as to whether or not there is shared space in the STR with the host or other guests/tenants. The listing types we defined are:

- Entire home/apartment: there are no shared spaces and no other tenants/hosts in the same private dwelling. The entire private dwelling is entirely for the guest. This includes the basement, if present. For example, a listing for a single detached home that includes the basement, main floor, and upper floors or a 1-bedroom apartment that is entirely not shared would both be an "entire home/apartment" listing.
- Entire suite: there are no shared spaces within the suite although laundry rooms, backyards, and the main entrance may be shared with the occupants of another (related) suite. There may be other occupants in the same private dwelling in another (related) suite. The suite comprises only a portion of the private dwelling. For example, a listing in a single detached house that has a private basement suite available to the guest while the host/other tenant lives on the main floor is an "entire suite".
- Private room: the guest has private access to a bedroom (and possible a bathroom) within the private dwelling unit. All other spaces are shared with the host or other tenants/guests, e.g., shared kitchen and living area.
- Shared room: the guest sleeps in a common room and all spaces are shared, e.g., the guest sleeps on a couch or air mattress in the shared living room.

Similarly, hosts are allowed to choose their "property type"; however, the choice is subjective and not standardized across hosts. To correct for this, we first conceptualize property type as referring to the structure of the private dwelling in which the STR is located. We then manually checked all Airbnb and VRBO/HomeAway listings in Calgary from April 2023 to July 2023 to determine their property type. In the manual inspection, we only classified a listing's property type if we could confirm their property type in a photograph: we did not rely on a host's self-described property type. The property types we used are:

- Single detached house (house): note that a STR listing in a legal secondary suite in an otherwise single detached house is classified as a single detached house.

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[11] Note that we did not clean/manually verify the Edmonton data due to time constraints.

- Apartment: high-rise apartments and condo buildings that are not townhouses, duplex's, triplexes, or fourplexes.
- Multi-family: multi-family dwellings including townhouses/row houses, duplex's, triplexes, and fourplexes.
- Guest house: STR listings in a structure that is not part of the main dwelling structure on the property. For example, detached laneway houses, carriage houses, and units over top of a detached garage all classify as a guest house.
- Camping: includes units one would camp in including trailers and tents.
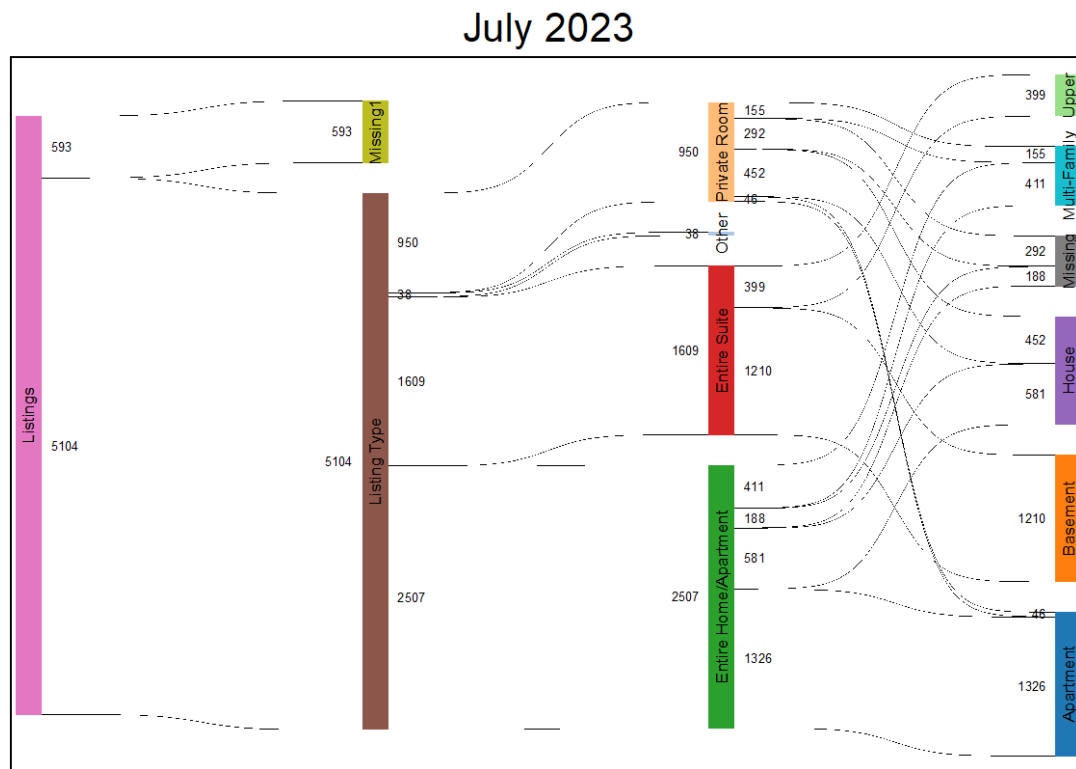
Figure 3 plots the number of active Airbnb and VRBO/HomeAway listings by our re-categorized listing types and property types for July 2023. There are 5,104 active Airbnb and VRBO/HomeAway listings that we could manually categorize (e.g., the listing had not been removed at the time of manual inspection). Of those, the most common listing type was entire home/apartments (2,507 or 49%) followed by entire suites (1,609 or 32%). Breaking that down further, the most common listing + property type was entire apartment units (1,326 or 26%) and the second most common type were basement suites (1,210 or 24%). Entire single detached houses are less common, with only 581 (11%) of Airbnb and VRBO/HomeAway listings appearing to be for an entire single detached house. Private rooms are not as common as either entire home/apartments or entire suites, and, when private rooms are listed, they are more likely to be in single detached houses: there are very few private room listings in apartments or multi-family units.[12]

This re-enforces and extends the analysis from Figure 1. As with Figure 1, even after manually re-coding listing types, entire home/apartment listings make up the majority of active Airbnb and VRBO/HomeAway listings while private rooms make up significantly less listings. However, we now also see that of entire home/apartment listings, it is more specifically entire apartment listings and entire basement suites that are the most common, while entire home listings and entire multi-family listings are fewer. Further, with respect to private room listings, private rooms in single detached houses make up the majority of private room listings.

There are two other notes to make. First, the number of entire suites and private room listings suggests many listings are located in dwellings where a portion of the dwelling is occupied by others (e.g., the hosts or other STR/LTR tenants). Second, this pattern suggests that STRs may differ by community. Communities with more apartments may have more entire apartment STR listings while communities with more single detached homes may have more entire suites and private room STR listings. We examine this issue in depth in the next section.

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[12] We examined this breakdown for April 2023, May 2023, and June 2023. While the number of listings per type change, the relative percentages are the same regardless of month.

July 2023

3.3 Spatial Analysis of Listings

In this section, we examine where STR's are located within Calgary. We allocate Airbnb and VRBO/HomeAway listings to a community (with community boundaries as defined by the City of Calgary). For most Airbnb and VRBO/HomeAway listings, the exact geographic location is not provided.[13] Rather, a latitude and longitude that is up to 150 meters away from the exact location is provided. To ensure we attribute the Airbnb and VRBO/HomeAway listing to the most likely community, we take the area that listing could be in, and figure out which communities it overlaps. We assign Airbnb and VRBO/HomeAway listings to the community with the most overlap.

In this section, we look at three different spatial patterns: general spatial distribution of STR listings across communities, STR listing growth by community, and STR listing type and property type by community. The purpose of this examination is to identify which communities have the most STR activity, and what that activity looks like.

3.3.1 General Spatial Distribution Across Communities

As stated, to begin we examine the number of active Airbnb and VRBO/HomeAway listings by Calgary community in April 2023 and July 2023 in Figure 4. Table 1 lists the top 10 communities by Airbnb and

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[13] There are some listings that provide an exact location. We take those as is.

VRBO/HomeAway listings in July 2023. In Table 1, centre communities are highlighted in green and developing communities are highlighted in orange.

Figure 4 and Table 1show that STR listings in Calgary are concentrated in centre communities. In particular, the Beltline has a far greater number of active Airbnb and VRBO/HomeAway listings than any other community regardless of the month examined. Outside of centre communities, developing communities of Seton, Livingston, and Cornerstone also have a large number of active Airbnb and VRBO/HomeAway listings (despite being located in different quadrants of the City).

Figure 4: Airbnb and VRBO Number of Listings by Community, April 2023 and July 2023
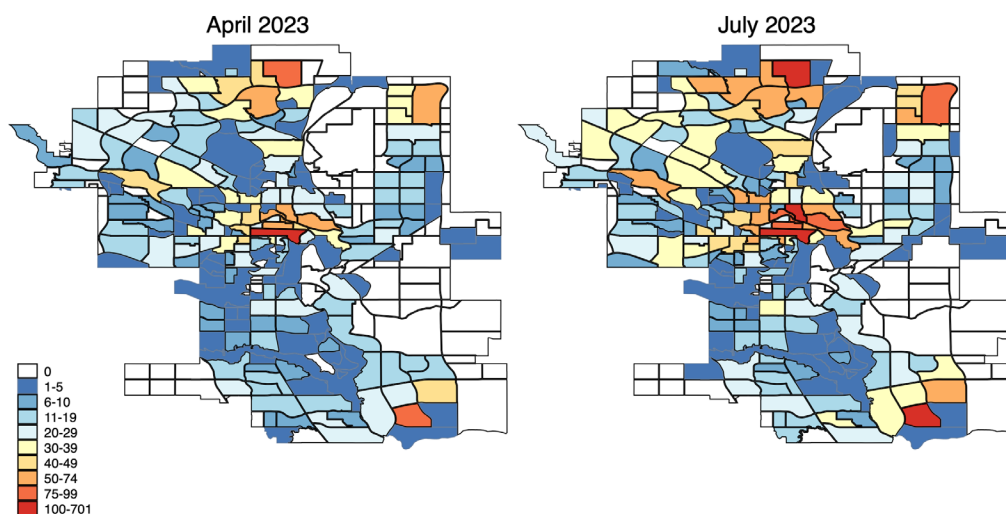

*Table 1: Top 10 Communities by Number of Airbnb and VRBO/HomeAway Listings, July 2023*

Community	Number of Airbnb and VRBO Listings	Sector	Community Status (as of 2021)
BELTLINE	701	CENTRE	ESTABLISHED
LIVINGSTON	128	NORTH	DEVELOPING
SETON	118	SOUTHEAST	DEVELOPING
CRESCENT HEIGHTS	115	CENTRE	ESTABLISHED
SUNNYSIDE	98	CENTRE	ESTABLISHED
DOWNTOWN COMMERCIAL CORE	88	CENTRE	ESTABLISHED
CHINATOWN	79	CENTRE	ESTABLISHED
BRIDGELAND/RIVERSIDE	78	CENTRE	ESTABLISHED
CORNERSTONE	76	NORTHEAST	DEVELOPING
DOWNTOWN EAST VILLAGE	75	CENTRE	ESTABLISHED

*For April 2023, May 2023, and June 2023 the top 10 communities by STR listings were very similar as in July 2023; however, their order differed somewhat (but Beltline was always the community with the most STR listings), and Panorama sometimes trades off with Downtown East Village.

3.3.2 Airbnb and VRBO/HomeAway Listing Growth by Community

Digging into these trends further, we next examine which communities have seen the strongest growth in active Airbnb and VRBO/HomeAway listings. Recalling from Figure 2 how the COVID-19 pandemic interrupted active Airbnb and VRBO/HomeAway listings in Calgary, we omit examining COVID years, and instead do a year-over-year comparison, comparing April 2019 to April 2023 and July 2019 to July 2023. Further, because many Calgary communities had zero active Airbnb and VRBO/HomeAway listings in July 2019 (e.g., the developing communities of Seton and Livingston), we cannot examine percentage growth. Instead, we examine absolute growth. Figure 5 provides a visual of the change in the number of Airbnb and VRBO/HomeAway listings between April 2019 to April 2023 (left panel) and July 2019 to July 2023 (right panel) by community. Table 2 lists the top 10 communities by Airbnb and VRBO/HomeAway listing growth between July 2019 and July 2023.

Figure 5: Airbnb and VRBO/HomeAway Listing Growth by Community Year-Over-Year, April and July
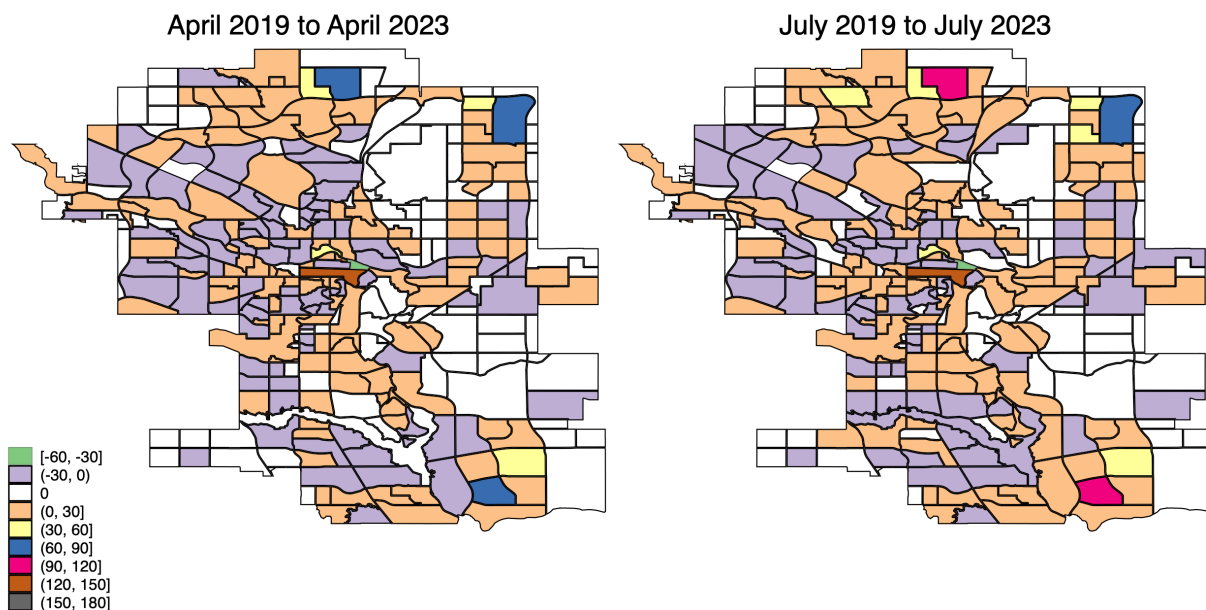
We make several observations from Figure 5 and Table 2. First, the majority of communities have had negative, zero, or small (e.g., less than 30 listings) Airbnb/VRBO/HomeAway listing growth between 2019 and 2023. Second, the majority of Airbnb/VRBO/HomeAway listing growth has been concentrated in developing communities. Some of these same developing communities, as of July 2023, had the most active Airbnb and VRBO/HomeAway listings by community (Table 1). In particular, Seton, Livingston, and Cornerstone all were part of the top 10 communities by number of active Airbnb and VRBO/HomeAway listings in July 2023. Third, outside of the Beltline, centre communities saw very little active Airbnb and VRBO/HomeAway listing growth. In fact, Downtown East Village lost 57 STR listings between July 2019 and July 2023, the largest decline of any community. This suggests that, despite the higher number of

Table 2: Top 10 Communities by Airbnb and VRBO/HomeAway Listing Growth, July 2019 to July 2023

Community	Change in the Number of active Airbnb and VRBO Listings	Sector	Community Status (2021)
BELTLINE	145	CENTRE	ESTABLISHED
LIVINGSTON	117	NORTH	DEVELOPING
SETON	94	SOUTHEAST	DEVELOPING
CORNERSTONE	73	NORTHEAST	DEVELOPING
CARRINGTON	57	NORTH	DEVELOPING
SUNNYSIDE	54	CENTRE	ESTABLISHED
CITYSCAPE	41	NORTHEAST	DEVELOPING
REDSTONE	39	NORTHEAST	DEVELOPING
SAGE HILL	38	NORTH	DEVELOPING
MAHOGANY	36	SOUTHEAST	DEVELOPING

active Airbnb and VRBO/HomeAway listings, listings in centre communities are not seeing large growth outside of the Beltline. Finally, the Beltline was the community with both the most active Airbnb and VRBO/HomeAway listings in July 2023 and saw the largest growth in active Airbnb and VRBO/HomeAway listings from July 2019 to July 2023. This suggests that the Beltline is the top community for STR activity.

3.3.3 Airbnb and VRBO/HomeAway Listing Type by Community

In our final spatial analysis of listings, we examine the different listing types in each community. Drawing from Figure 3, we look at July 2023 listings and break down Airbnb and VRBO/HomeAway listings in each community into basement suites, upper suites, entire apartments, entire single detached homes, entire multi-family homes, and private rooms in a house. Further, we retain only those communities with 35 or more listings in July 2023. For each community, we find the percentage of active Airbnb and VRBO/HomeAway listings by listing type and plot it in Figure 6 for centre communities, Figure 7 for developing communities, and Figure 8 for "other" communities (i.e., not a centre community nor a developing community).

From these figures, we see that Airbnb and VRBO/HomeAway listings in centre communities are more likely to be entire apartments. Of the 24 centre communities with 35+ listings, entire apartment listings make up the largest type of listing in 15 of them. Further, some centre communities with the highest number of Airbnb and VRBO/HomeAway listings have nearly 100% entire apartment listings. This includes: the Beltline, Chinatown, Downtown Commercial Core, and Downtown East Village. Likewise, Cliff Bungalow, Sunnyside, and Mission—also centre communities but with not as many Airbnb and VRBO/HomeAway listings—also have a higher percentage of entire apartment STR listings (between 60% and 90%). The remaining Centre communities examined have a wider variety of STR types. Of note, Banff Trail has a high percentage of Airbnb and VRBO/HomeAway listings that are private rooms in a single detached house. This is likely due to its location near the University and the LRT, making it a popular location for students.

Second, Airbnb and VRBO/HomeAway listings in developing communities are more likely to be basement suites. Except for Redstone, all the developing communities with 35+ Airbnb and VRBO/HomeAway

listings have 20% of greater of their Airbnb and VRBO/HomeAway listings being basement suites. Entire apartment listings are much less prominent; however, they do make up a mid-percentage of listings in Skyview, Seton, Redstone, and Cornerstone.

Finally, active Airbnb and VRBO/HomeAway listings in "other" communities are more varied than in developing or centre communities. Entire houses, entire multi-family units, basement suites, upper suites and private rooms in detached houses all have a significant presence in these communities. The least likely listing type in there "other" communities are entire apartments.

Figure 6: Airbnb and VRBO/HomeAway Listings by Listing Type and Community, Centre Communities, July 2023

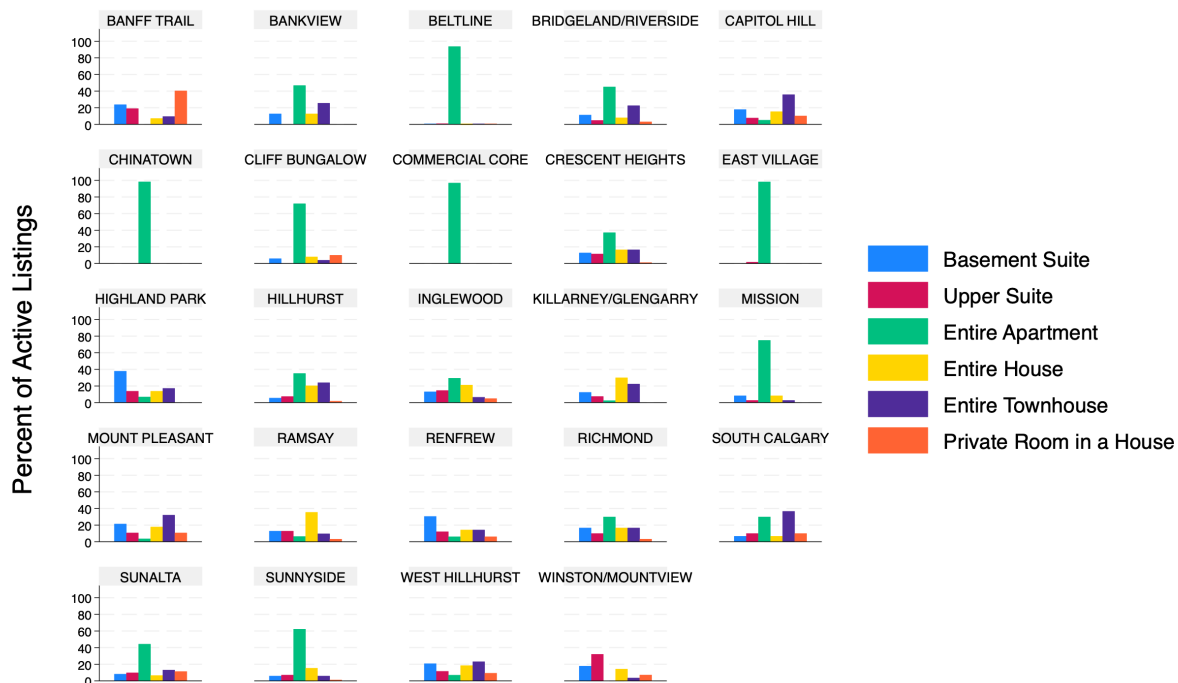**Short-Term Rentals in Calgary** | UNIVERSITY OF CALGARY

Figure 7: Airbnb and VRBO/HomeAway Listings by Listing Type and Community, Developing Communities, July 2023
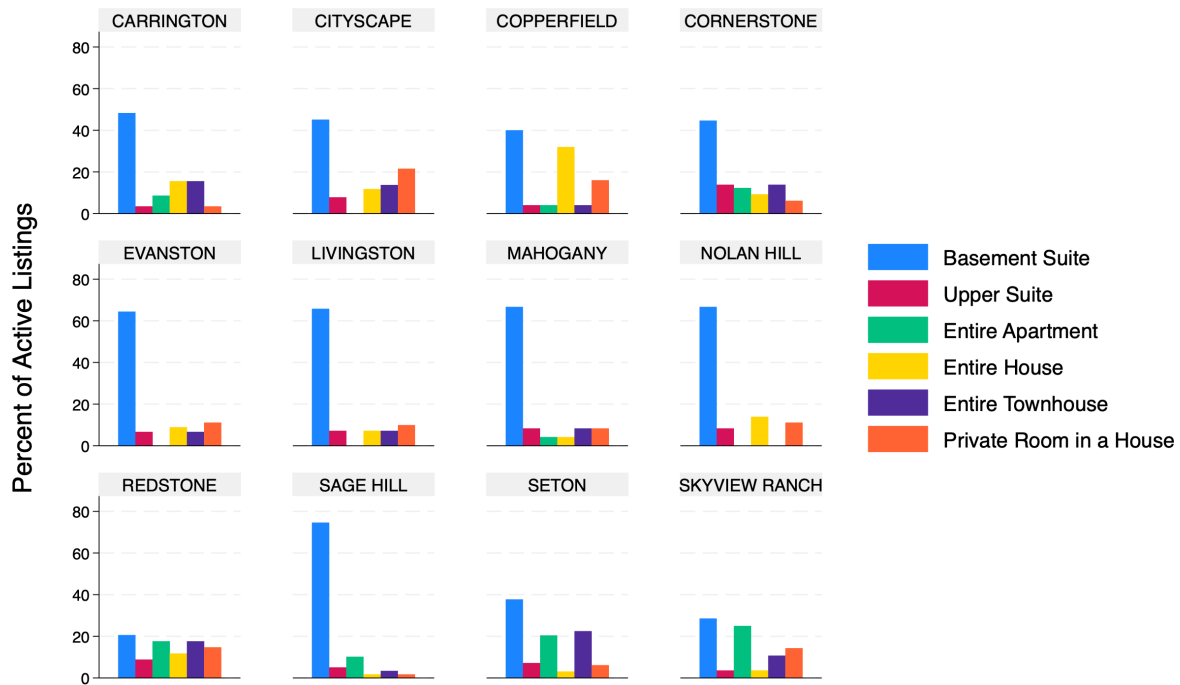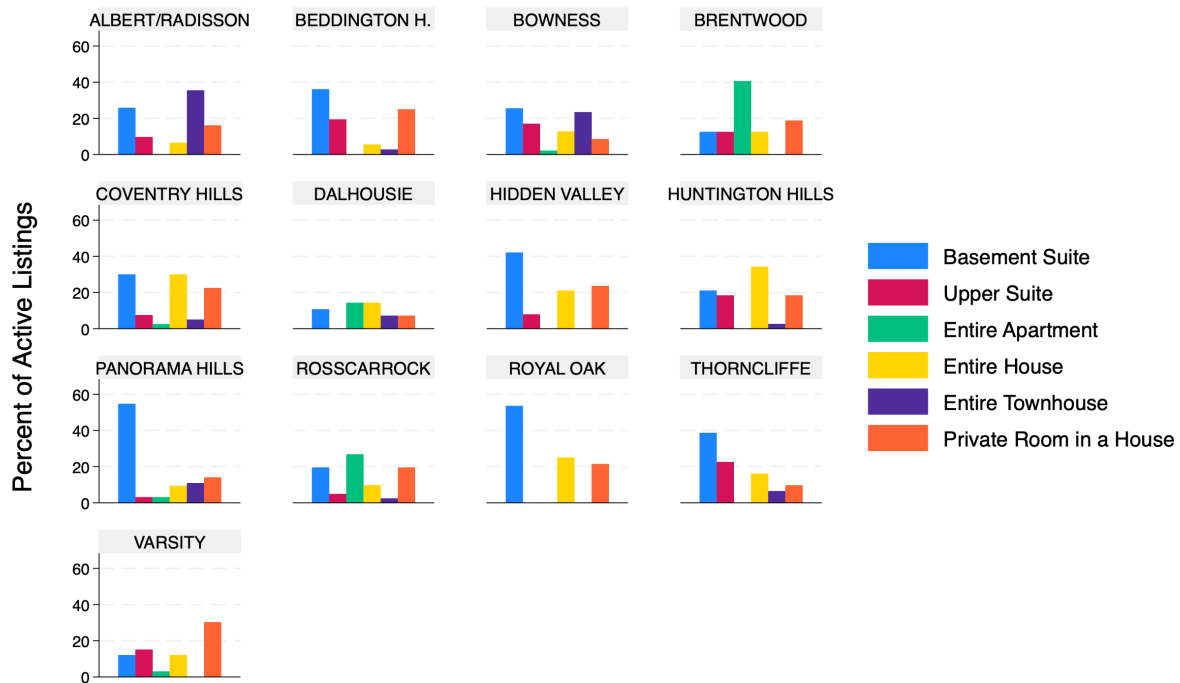

Figure 8: Airbnb and VRBO/HomeAway Listings by Listing Type and Community, Other Communities, July 2023

To conclude: Figure 3 told us that entire apartments were the main Airbnb and VRBO/HomeAway listing type in Calgary in July 2023 followed by basement suites. Breaking this down by community provides a more nuanced view and shows us that listing type varies by community. Centre communities are the most likely to have entire apartment listings whereas developing communities are the most likely to have basement suites. This variation is most likely due to housing type in each community. While we do not have data to confirm, it is intuitively likely that centre communities in the downtown core, have more apartments/condos and less multi-family (townhouses, duplex, triplex) and single detached houses, while the opposite is true in developing communities.[14]

Another explanation for the increased presence of basement suites in developing communities is changes to the process for approval of secondary suites combined with zoning changes. Prior to March 2018, homeowners that wanted to renovate their home and include a legal secondary suite had to appear in from of City council to request a land use re-designation. As of March 2018, this requirement was abolished and homeowners were required, instead, to register their secondary suite and prove they met certain safety and legal requirements. With respect to zoning, as of April 2016, the Residential Low Density Mixed Housing (R-G)(R-Gm) District was introduced. Under the RG zoning, more flexible forms of housing were allowed and, in particular, secondary suites are a permitted use: approval before City council for a secondary suite (prior to March 2018) was not required. After April 2016, developing communities sought the RG zoning designation, and were able to include secondary suites as an additional (optional) feature to those looking to build a house in the community.[15] In sum, newer homes in developing communities are more likely to have basement suites due to RG zoning compared to established communities (e.g., centre communities) who were established before RG zoning and were not initially built with basement suites.

Calgary STR Listing Summary

- Despite the reduction in STR listings during the COVID-19 pandemic, STR listings in Calgary are higher than ever and appear to be growing at the pre-COVID rates.
- The communities with the greatest number of STR listings are centre communities and developing communities, while STR listing growth is primarily driven by developing communities such as Seton Livingston, and Cornerstone, as well as the Beltline. These are the communities that likely experience the greatest STR activity.
- The most frequent listing type in Calgary are entire apartment listings followed by basement suites; however, this differs by community. Centre communities (e.g., the Beltline East Village, Commercial Core) are more likely to have entire apartment listings, while developing communities (e.g., Seton, Livingston, Cornerstone) are more likely to have basement suite listings, and "other" communities have a more varied mix of listings. These differences are likely driven by the different choice of housing in different communities and zoning.

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[14] Note that Census 2021 data that would allow us to confirm this is not available by community. And, while Census 2016 data is available, it does not encompass the developing communities.

[15] See for example https://app.tricohomes.com/communities/seton

4. Demand Side: A Look at Airbnb and VRBO/HomeAway Bookings, Occupancy Rate, and Community Impact

STR listings are only one side of the STR market – the supply side. In this section, we examine the demand side of the STR market in Calgary. In particular, we examine the number of nightly bookings per month in active Airbnb and VRBO/HomeAway listings, their occupancy rate, and STR-related complaints. We further beak these down by communities. This will give us a sense of not just how many listings there are, but how frequently they are visited by guests, particularly post-pandemic, and the impact on the peace of the community.

4.1 Time Trends: Nightly Bookings

We begin by examining the number of nightly bookings in active Airbnb and VRBO/HomeAway per month to determine whether and how the COVID-19 pandemic affected STR bookings in Calgary. In July 2023, there were 96,723 nightly bookings in Calgary Airbnb's and VRBOs/HomeAway's—the highest number of nightly bookings per month recorded. Figure 9 shows a time trend of the number of nightly bookings per month in active Airbnb and VRBO listings for Calgary (left graph) and Edmonton (right graph) between January 2017 and July 2023. The black line shows total bookings in an active listing, the blue line shows bookings in active listings that are self-described by hosts as an "entire home/apartment", and the red line shows bookings in active listings that are self-described by hosts as "private rooms".[16,17]

Figure 9 shows that nightly bookings per month display a seasonal trend. In Calgary, bookings are always highest during Stampede months (July) with another smaller peak in December. In Edmonton, bookings are highest in July or August during Capital Ex with smaller peaks in December. This is consistent with seasonal trends seen with active listings in Figure 1.

Further, while nightly bookings in Airbnb and VRBO/HomeAway's have increased over the time period examined, this increase has not been consistent. Airbnb and VRBO/HomeAway nightly bookings declined in both cities beginning in early 2020 at the onset of the COVID-19 pandemic. Nightly bookings in both cities began to recover in summer 2021. Calgary nightly bookings surpassed pre-pandemic levels in October 2022, the same month the number of active listings surpassed pre-pandemic levels. Edmonton nightly bookings surpassed pre-pandemic levels in March 2022, seven months before Calgary and three months before their number of active listings surpassed pre-pandemic levels. This suggests a faster re-bounding of demand in Edmonton compared to Calgary and compared to supply (e.g., listings).

As with listings, the majority of Airbnb and VRBO/HomeAway nightly bookings in Calgary and Edmonton are in self-described "entire home/apartments" listings: around 82% of all Airbnb and VRBO/HomeAway nightly bookings in July 2023 were in self-described "entire home/apartments" listings in both cities. Nightly bookings in self-described private rooms are growing in both Calgary and Edmonton post-COVID; however, as with listings, they have not yet reached pre-pandemic levels. This growth of nightly bookings

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[16] Note that active listings self-described as "shared rooms" are not shown as they make up less than 1% of active listings.

[17] As we will show, these self-described listing types are not standardized. We standardize them based on manual inspections for April 2023 – July 2023 and present the results below.

in self-described private rooms appears to be somewhat stronger than the growth in active listings; however, this will be examined in the section on occupancy rate.

Figure 9: Active Airbnb and VRBO/HomeAway Nightly Bookings per Month, Calgary and Edmonton, January 2017 - July 2023
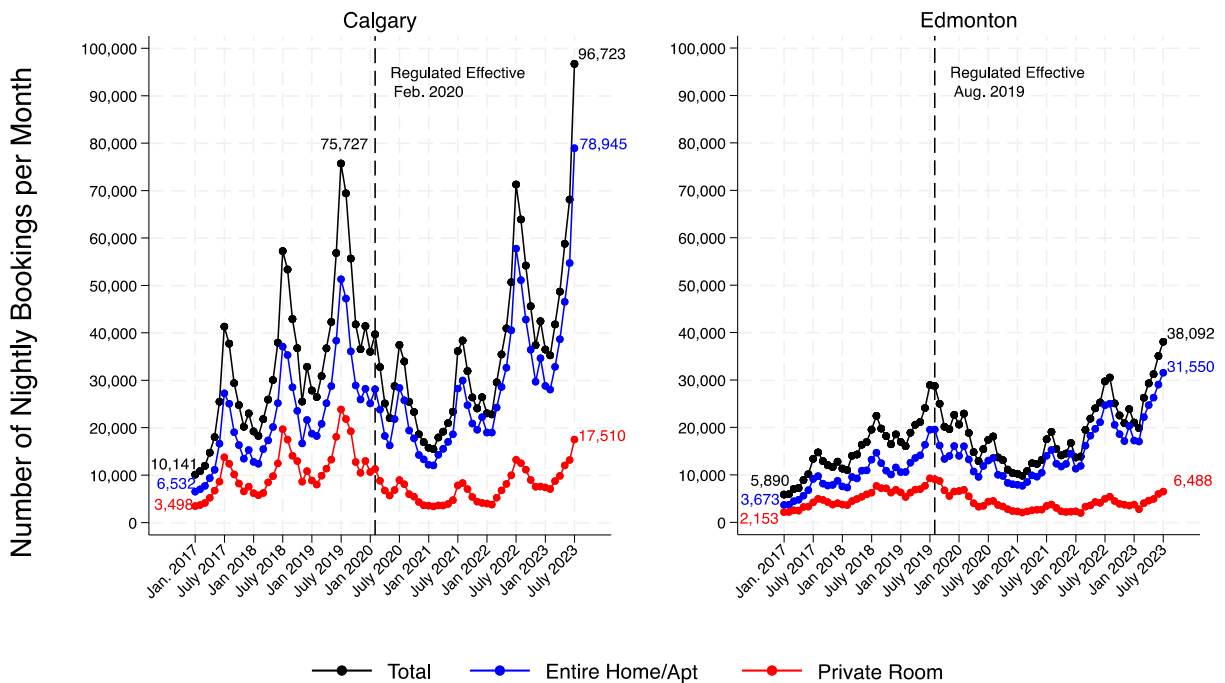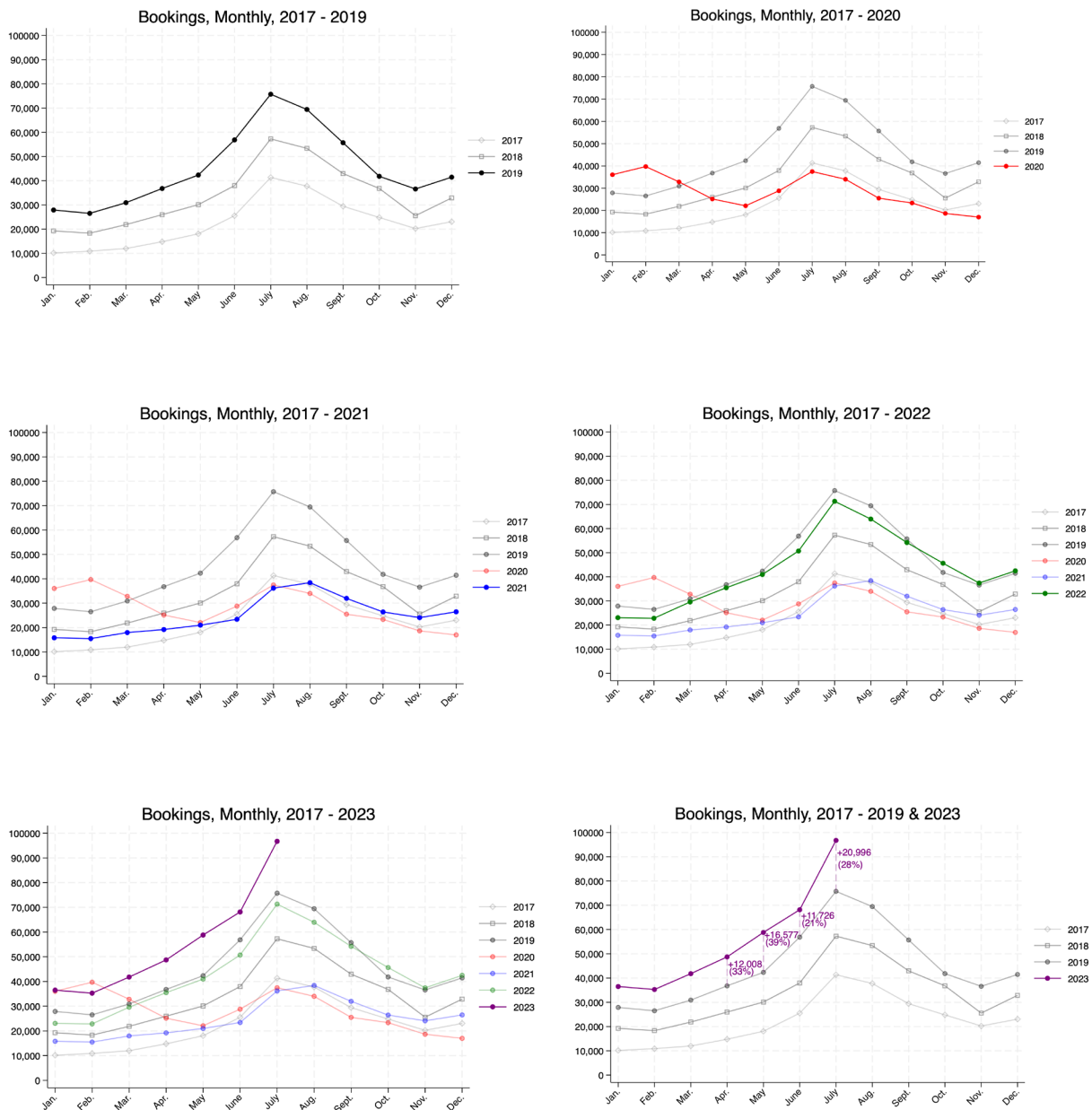

4.2 Year-Over-Year Change in Nightly Bookings

To examine the effect of the COVID-19 pandemic on the STR market in Calgary in closer detail, Figure 10 plots the number of Airbnb and VRBO/HomeAway nightly bookings per month year-over-year. The first panel of Figure 10 only includes pre-pandemic years, 2017 to 2019. Each additional panel introduces one additional post-pandemic year until all years are shown (2017 to 2023). This allows us to examine the number of nightly bookings per month for each year in isolation.

In the top left panel of Figure 10, we see that from 2017 to 2019, Airbnb and VRBO/HomeAway nightly bookings in Calgary grew steadily from 10,136 bookings in January 2017 to 41,455 bookings in December 2019 — a 309% increase in bookings. However, when the pandemic hit in March 2020, we see from the top right figure, Airbnb and VRBO/HomeAway nightly bookings in Calgary declined to below 2017 levels. They remained below 2017 levels until August 2021 (middle left panel). In October 2022, the number of Airbnb and VRBO/HomeAway nightly bookings surpassed 2019 nightly bookings (at the same time as listings shown in Figure 2). This growth trend has continued and increased into 2023. As the bottom right panel shows, the number of nightly bookings in July 2023 was up 20,996 bookings (28%) from the number of bookings in July 2019. As with active Airbnb and VRBO/HomeAway listings, this suggests that Airbnb and VRBO/HomeAway nightly bookings are once again on a steadily increasing growth path in Calgary despite being interrupted by the pandemic.

4.3 Occupancy Rate

So far, we have documented that for both Airbnb and VRBO/HomeAway active listings and nightly bookings they have been back on pre-COVID growth paths. The question for this section is: what are the relative growth rates? Have active listings and nightly bookings grown at the same rate or has one outpaced the other? This is important because if there are more active listings than nightly bookings, Airbnb and VRBO/HomeAway listings may be quiet and have very little impact on the peace of a

community. However, if Airbnb and VRBO/HomeAway nightly bookings are outpacing active listings, there may be a higher level of traffic and turn-around that may be more disruptive to the peace of a community.

As suggested, we examine the occupancy rate. Occupancy rate is calculated by taking, for each individual active Airbnb and VRBO/HomeAway listing, the number of nightly bookings in a month divided by the number of nights available in a month. For example, if an active listing is available 30 nights of a month and is booked for 15 nights in the same month, the occupancy rate is 50%.[18] The "average occupancy rate" is the average of the occupancy rate across all active Airbnb's and VRBO's/HomeAway's in a month. Figure 11 shows the average occupancy rate of active Airbnb and VRBO/HomeAway listings for Calgary (left graph) and Edmonton (right graph) between January 2017 and June 2023. The black line shows average occupancy rate across all listing types. The blue line shows the average occupancy rate in active listings that are self-described by hosts as an "entire home/apartment", and the red line shows the average occupancy rate in active listings that are self-described by hosts as "private rooms". In general, if active listings have grown at a faster rate than nightly bookings, we expect to see a drop in the average occupancy rate and vice versa.

Figure 11 shows the similar seasonal trends seen with active listings and nightly bookings. The average occupancy rate is always highest in Stampede months (July) for Calgary and in July/August for Edmonton (Capital Ex). Interestingly, there is no peak in occupancy rate in December suggesting there may be more active listings available compared to nightly bookings.

Figure 11: Airbnb and VRBO/HomeAway Average Occupancy Rate, Calgary and Edmonton, January 2017 - July 2023
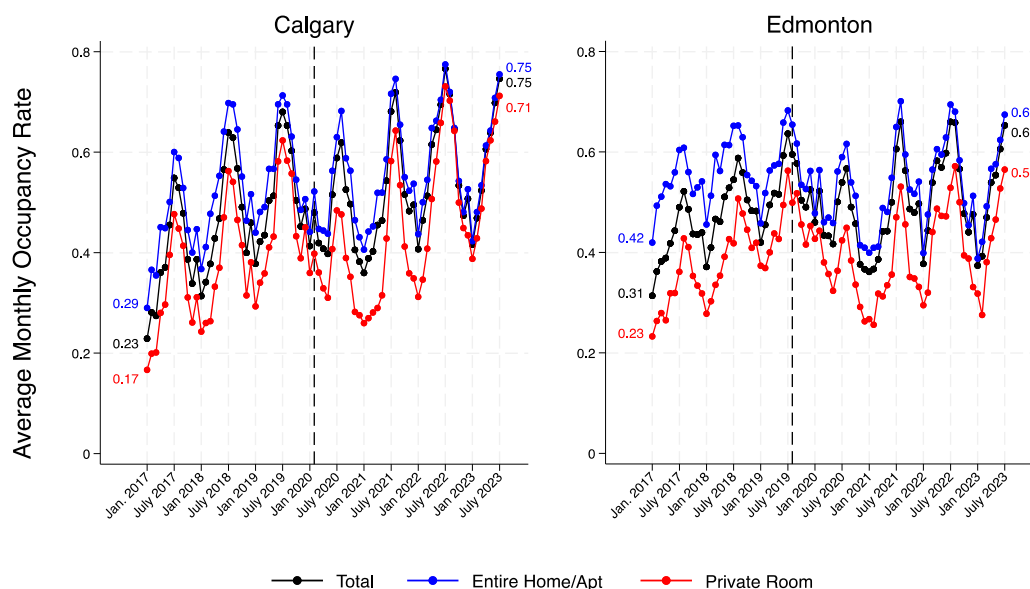
Also, in recent months another interesting pattern has emerged. The average occupancy rate in Calgary grew steadily pre-pandemic, and then, as with active listings and nightly bookings, it was interrupted by the pandemic. The occupancy rate increased again between summer 2021 and summer 2022 in Calgary;

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[18] A host may "block" nights. If a night is blocked, that listing is not available for that blocked night.

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however, as of summer 2023, the occupancy rate has slowed and declined. In summer 2023, the occupancy rate was lower than the occupancy rate in summer 2022 in Calgary. Likewise, for Edmonton, the occupancy rate initially increased post-pandemic from 2020 to 2021; however, it has stagnated and declined since then. This suggests that in Calgary as of summer 2023 and in Edmonton as of 2021/2022, the growth in the number of active listings has outpaced the growth in nightly bookings per month: the supply side has grown faster than the demand side. This same trend is observed for both self-described entire home/apartment listings and for self-described private rooms.

4.4 Nightly Bookings and Occupancy Rate by Community

As seen with STR listings, these time trends that aggregate across Calgary hide community-level patterns that are important to understanding the STR market. In this section, we examine Airbnb and VRBO/HomeAway nightly bookings and occupancy rate by community. We examine both April 2023 and July 2023. As seen in the time trend graphs, April tends to be a quieter month for the STR market while July tends to be a busier month. Further, both April 2023 and July 2023 are post-COVID.

Figure 12 shows the number of bookings (left) and the occupancy rate (right) in April 2023 in Calgary by community. Likewise, Figure 13 shows the number of bookings (left) and the occupancy rate (right) for July 2023 in Calgary by community. Note that for occupancy rate, we have limited our examination to those communities with more than five Airbnb's and/or VRBO/HomeAway's.[19] Table 3 shows the top 10 communities by bookings while Table 4 shows the top 10 communities occupancy rate, both for July 2023.

From these figures and graphs, we make several observations. First, unsurprisingly, the communities with the most nightly bookings largely mirror the communities with the most active Airbnb and VRBO/HomeAway listings. These communities are all either in the centre or a developing community. However, despite the fact that these communities have the most active listings and nightly bookings, they do not necessarily have the highest occupancy rate. For example, the Beltline, which has the most active Airbnb and VRBO/HomeAway listings and nightly bookings, is only ranked 107th of 166 communities with an occupancy rate of 74%. Regardless, the top 10 communities by nightly bookings in Table 3 all have an occupancy rate of 67% or greater, indicating they were relatively busy STR communities in July 2023.

Second, the top 10 communities by occupancy rate are not in the top 10 lists for active listings nor nightly bookings. Further, they have very few Airbnb or VRBO/HomeAway listings (25 or less), and none of them are in centre communities. This suggests that, on the one hand, Airbnb and VRBO/HomeAway listings in centre communities have more competition and thus may not have as high an occupancy rate as active listings in less competitive communities. Furthermore, it suggests that Airbnb and VRBO/HomeAway listings in competitive STR communities are sought after by guests. This may be because of their location, e.g., away from busier Stampede grounds, closer to family/friends, etc., or easier access, e.g., less parking restrictions/more free parking.

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[19] There are some communities with only 1 or 2 STR listings with very high occupancy rates. This results in an irregularly high occupancy rate, obscuring the general pattern.

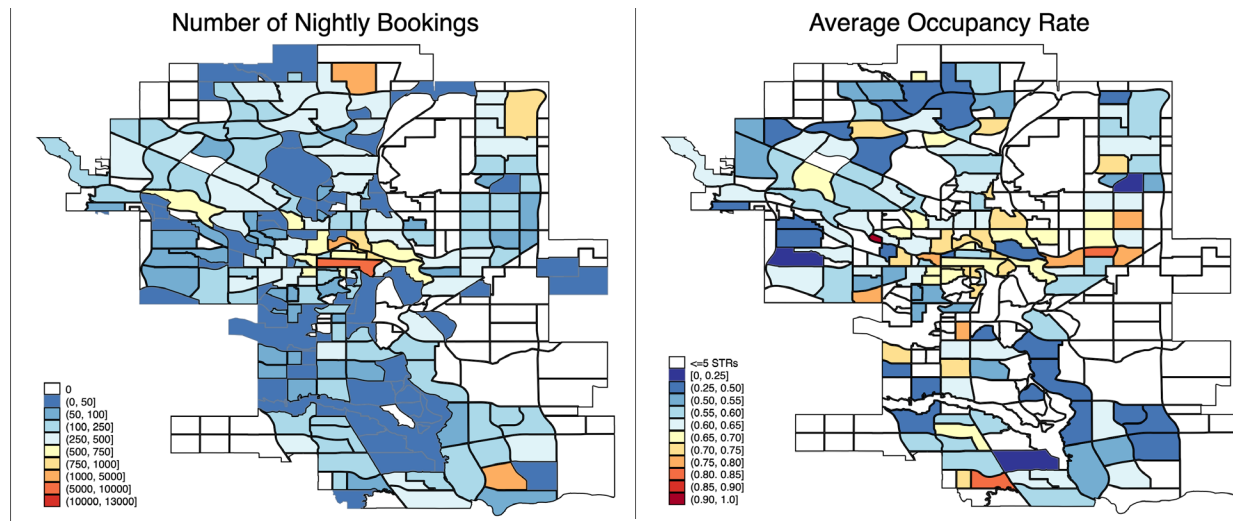*Figure 12: Bookings and Occupancy Rate by Community, April 2023*

Number of Nightly Bookings

Average Occupancy Rate

Figure 13: Bookings and Occupancy Rate by Community, July 2023

Number of Nightly Bookings

Average Occupancy Rate
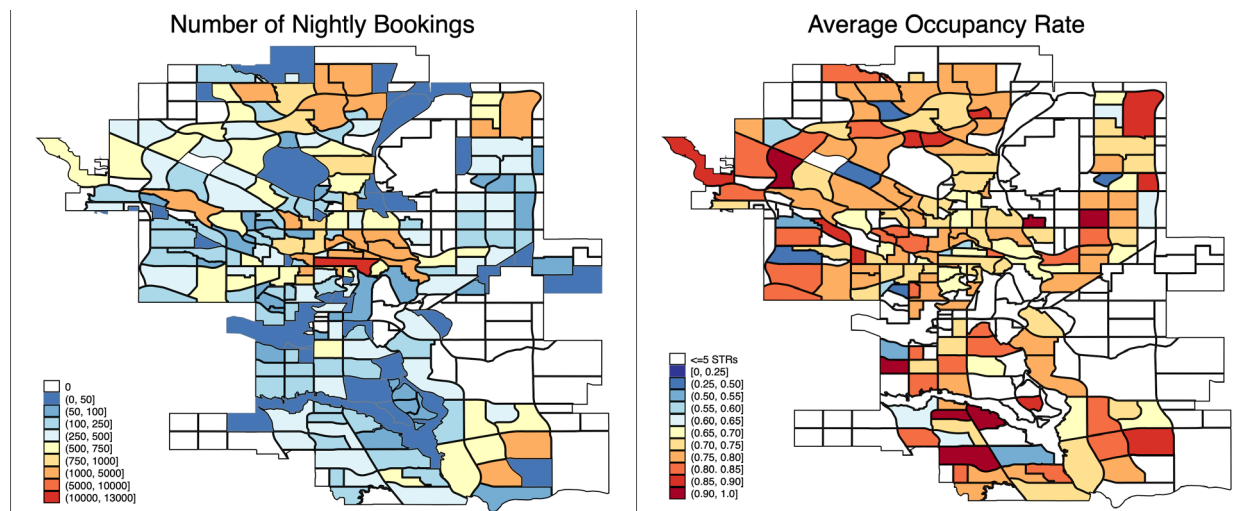
Finally, how much STR activity is in a community differs by time period. We present here data for July 2023 which is a snapshot in time. July is a very busy month for STRs due to stampede. Other months are less busy. In looking at other months, the top 10 communities by nightly bookings only changes marginally. For average occupancy rate, the change in the ranking of communities across time periods is more substantial. For example, of the top 10 communities by occupancy rate in July 2023, zero of those are in the top 10 communities by occupancy rate in April 2023, and they also have very few active listings and nightly bookings. These temporal changes need to be kept in mind when considering the data.

Table 3: Top 10 Communities by Nightly Bookings, July 2023

Community	Number of Nightly Bookings	Occupancy Rate	Sector	Community Status (2021)
BELTLINE	12,408	.74	CENTRE	ESTABLISHED
LIVINGSTON	2,246	.76	NORTH	DEVELOPING
SETON	2,008	.77	SOUTHEAST	DEVELOPING
CRESCENT HEIGHTS	1,898	.75	CENTRE	ESTABLISHED
SUNNYSIDE	1,838	.78	CENTRE	ESTABLISHED
DOWNTOWN EAST VILLAGE	1,572	.85	CENTRE	ESTABLISHED
CORNERSTONE	1,493	.86	NORTHEAST	DEVELOPING
CHINATOWN	1,326	.67	CENTRE	ESTABLISHED
BRIDGELAND/RIVERSIDE	1,273	.69	CENTRE	ESTABLISHED
BOWNESS	1,204	.75	NORTHWEST	ESTABLISHED

Table 4: Top 10 Communities by Occupancy Rate, July 2023

Community	Average Occupancy Rate	Number of Listings	Number of Bookings	Sector	Community Status (2021)
VISTA HEIGHTS	.94	7	145	NORTHEAST	ESTABLISHED
CEDARBRAE	.93	10	233	SOUTH	ESTABLISHED
RUNDLE	.93	10	157	NORTHEAST	ESTABLISHED
SILVERADO	.92	22	368	SOUTH	DEVELOPING
MIDNAPORE	.91	9	106	SOUTH	ESTABLISHED
SCENIC ACRES	.91	19	349	NORTHWEST	ESTABLISHED
MILLRISE	.90	6	127	SOUTH	ESTABLISHED
COUNTRY HILLS VILLAGE	.89	7	153	NORTH	ESTABLISHED
MACEWAN GLEN	.89	8	93	NORTH	ESTABLISHED
HASKAYNE	.88	25	557	NORTHWEST	DEVELOPING

4.5 Community Impacts: Complaints by Community

In this section, we examine whether and how the busier STR communities identified above affect their communities. In particular, we look at complaints by community.[20] To do this, we count the total number of complaints to by-law that are STR related from May 2022 to April 2023. We use a year's worth of complaints as there are very few complaints in any given month. We focus on the total number of complaints as we are concerned here with community impact: the number of complaints indicates the total level of community disruption. Complaints range from noise-related to untidy private/public

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[20] This data was provided to us from the City Calgary and covers the period from January 2018 to April 2023 by community. It includes all complaints made to the City of Calgary 311 line (e.g., non-emergency by-law services) that includes the mention of an STR or related phrasing (e.g., Airbnb, VRBO, etc.).

property, to ice/snow on sidewalk and unkept lawn and weeds. Overall, over this time frame, there were 1,031 complaints, with 175 (17%) of those being noise complaints.

Figure 14 shows the total number of complaints over May 2022 to April 2023 by community while Table 5 lists the top 10 communities by number of STR-related complaints. The Beltline has the most complaints by far, with 77 complaints from May 2022 to April 2023 (and 58 (75%) of those are noise complaints). The community with the second most number of complaints was Crescent Heights with a total of 62 complaints from May 2022 to April 2023.

Surprisingly, other communities with a large number of listings have relatively fewer complaints. For example, Seton and Livingston—which both had a high number of STR listings and were some of the fastest growing communities with respect to STR listings—had few complaints. Seton had six STR-related complaints and Livingston had 15 STR-related complaints from May 2022 to April 2023.

Figure 14: Number of STR-Related Complaints by Community, May 2022 – April 2023
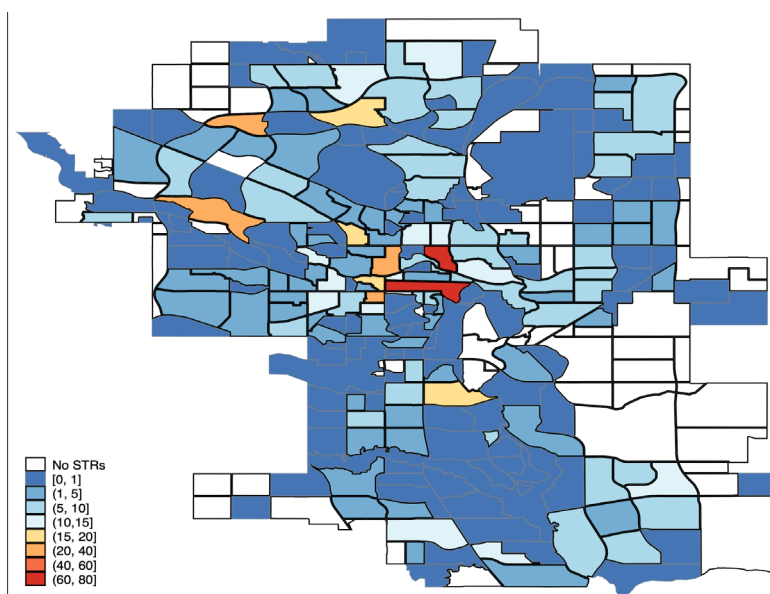
Table 5: Top 10 Communities by Number of Complaints, May 2022 - April 2023

Community	Number of Complaints	Sector	Community Status (2021)
BELTLINE	77	CENTRE	ESTABLISHED
CRESCENT HEIGHTS	62	CENTRE	ESTABLISHED
HILLHURST	30	CENTRE	ESTABLISHED
BANKVIEW	28	CENTRE	ESTABLISHED
CITADEL	27	NORTHWEST	ESTABLISHED
BOWNESS	21	NORTHWEST	ESTABLISHED
BANFF TRAIL	20	CENTRE	ESTABLISHED
ACADIA	18	SOUTH	ESTABLISHED
SUNALTA	17	CENTRE	ESTABLISHED
HIDDEN VALLEY	16	NORTH	ESTABLISHED

We hypothesize that this difference across communities is associated with listing type. That is, we hypothesize that communities with a higher percentage of entire apartment and entre multi-family unit STRs will have more complaints than communities with a higher percentage of entire basement suites, entire upper suites, and entire single detached house STRs.[21] This is because entire apartment and entre multi-family unit STRs are potentially in closer contact with non-STR related residents whereas entire basement suites, upper suites, and entire single detached house STRs are somewhat removed from interactions with non-STR related residents. To verify this, we examine the correlation between the percentage of listings in a community by listing type (as re-categorized by us and shown in Figure 3) and the total number of STR-related complaints in a community. We find that the sign of the correlation coefficient verifies this hypothesis: a higher percentage of entire apartment and entre multi-family unit STRs is associated with an increase in STR-related complaints whereas a higher percentage of entire basement suites, upper suites, and entire single detached house STRs is correlated with a decline in the number of STR-related complaints. It should be noted that these correlations were not statistically significant except for the correlation between total complaints and the percentage of entire apartments.

Together, this information leads to the following observations. Communities with a higher number of complaints tend to be located in the centre and have a relatively high number of active Airbnb and VRBO/HomeAway listings. The number of active listings is only partially contributing to this result as not all communities with a large number of active listings have a large number of STR-related complaints, particularly in developing communities. These results may be correlated with the type of listings that are more prevalent in communities. Particularly, an increase in the percentage of listings that are suites or entire single detached houses are correlated with less complaints while an increase in the percentage of listings that are entire apartments or entire multi-family units are correlated with more complaints.

Calgary Nightly Bookings and Occupancy Rate: Summary

- While the COVID-19 pandemic interrupted the growth of nightly bookings, growth has resumed post-COVID, particularly for self-described entire home/apartment listings.
- However, this growth in nightly bookings has been slightly slower in recent months than the growth in active listings as indicated by the recent decline in the occupancy rate. This suggests that the supply of STR's is outstripping demand somewhat.
- Unsurprisingly, by community, nightly bookings are concentrated in communities with more active listings. Communities with the most nightly bookings are located in centre communities and developing communities, and, while they do not have the highest occupancy rates, they do have high (69%+) occupancy rates, indicating significant STR traffic in these communities.
- Communities with more STR-related complaints tend to be located in centre communities, have a higher number of active listings and nightly bookings, *and* have a higher percentage of listings that are entire apartment or entire multi-family unit listings. The overall business of the STR and the proximity to non-STR related neighbors both appear to matter.

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[21] Note that we look at the percentage of listing type as opposed to the number by listing type. What we want to know is how the composition of STR listings (not the number) affects the total number of complaints.

5.   Monetary Incentives: Revenues of Airbnb and VRBO Listings

In this section, we examine revenues made by Airbnb and VRBO/HomeAway hosts in Calgary. Along with being another indicator of market size, STR revenues have also been found in the STR literature to vary by community, potentially indicating communities with higher STR potential. Thus, we examine both the general revenue time trend followed by a spatial analysis of revenues.

5.1 Revenue Time Trends

In July 2023 alone, Calgary Airbnb and VRBO/HomeAway active listings earned collectively $22.1 million CAD. While this is a large number, it should be remembered that this is revenue, not profit. Out of this revenue, hosts cover fees such as cleaning fees and utilities, as well as various government taxes and levies, including GST (if applicable), property taxes, income taxes, and the Alberta Tourism Levy.[22]

Since January 2017, the revenue earned by Airbnb and VRBO/HomeAway hosts has increased. Figure 15 shows this increase in revenue for all Airbnb and VRBO/HomeAway listings (black line), self-described entire home/apartments (blue line), and self-described private rooms (red line) in both Calgary (right panel) and Edmonton (left panel). In Calgary, total revenue grew from $0.9 million in January 2017 to $22.1 million in July 2023: an increase of over 2,000%. As with active listings and nightly bookings, Figure 15 shows that while the COVID-19 pandemic interrupted the growth of revenues, since about summer 2021, total revenues have continued their upward trend and are higher than ever before. However, this should be interrupted with caution. Given the high inflation in 2023 and the increasing government taxes (including the introduction of the Alberta Tourism Levy effective in April 2021), the cost of operating an STR are also higher than ever before.

1.1 Revenue by Community

In July 2023, Airbnb and VRBO/HomeAway active listings made an average revenue of $4,047/month in Calgary (after removing listings which made zero revenue). However, average listing revenue varies by community[23] and by listing type. To examine average listing revenue by community, we again show a heat graph of average revenue by community for July 2023 in Figure 16. In Panel A, we include only entire home/apartments (as manually verified by us). In Panel B, we include only entire apartments, Panel C includes only entire suites (upper or basement), and Panel D includes only entire detached houses or entire multi-family units (townhouses, duplexes, and triplexes). Table 6 shows the top 10 communities by average revenue per active entire unit listing. For all, we only show communities where there are five or more of the listing type in the community.

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[22] Our data does not include information on the costs of operating an STR.

[23] Note that we do not show total STR revenue by community here. Usurpingly, it largely follows the same pattern seen in the listings and nightly bookings analysis previously with centre communities like the Beltline and developing communities such as Seton and Livingston, being top earners.
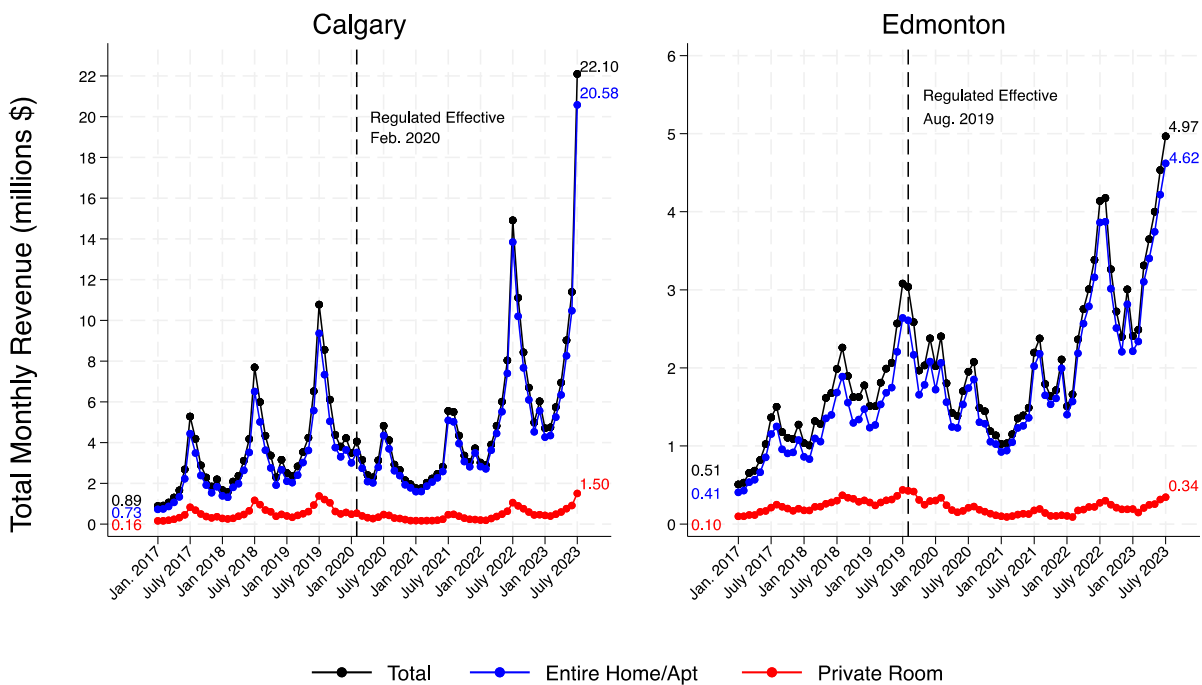
The first observation to make is that communities with more active listings and more nightly bookings do not necessarily have a higher average revenue per listings. For example, entire unit listings in the Beltline earned on average $5,577/month—less than half the average revenue earned by entire unit listings in New Brighton ($12,761/month). Active listings in Seton and Livingston earned even less on average ($2,872/month and $3,771/month, respectively).

Second, of the top 10 communities by average revenue per entire unit listing, centre communities make up six of them. However, this is weighted by the disproportionately high average revenue per entire suite listings and per entire detached house listing in those same centre communities. Entire apartment listings in centre communities do not earn as much on average as entire apartment listings outside of centre communities.

Finally, entire detached house and entire multi-family listings made the highest average revenue in general whereas entire suites earn the lowest average revenue.

Figure 16: Average Revenue by Community, July 2023

Panel A: All Entire Unit Listing Types

Panel B: Entire Apartments

Panel C: Entire Suites

Panel D: Entire Houses and Multi-Family Units

Legend:
- <5 STRs/0
- (0, 1500]
- (1500, 2500]
- (2500, 3000]
- (3000, 3500]
- (3500, 4000]
- (4000, 4500]
- (4500, 5000]
- (5000, 7500]
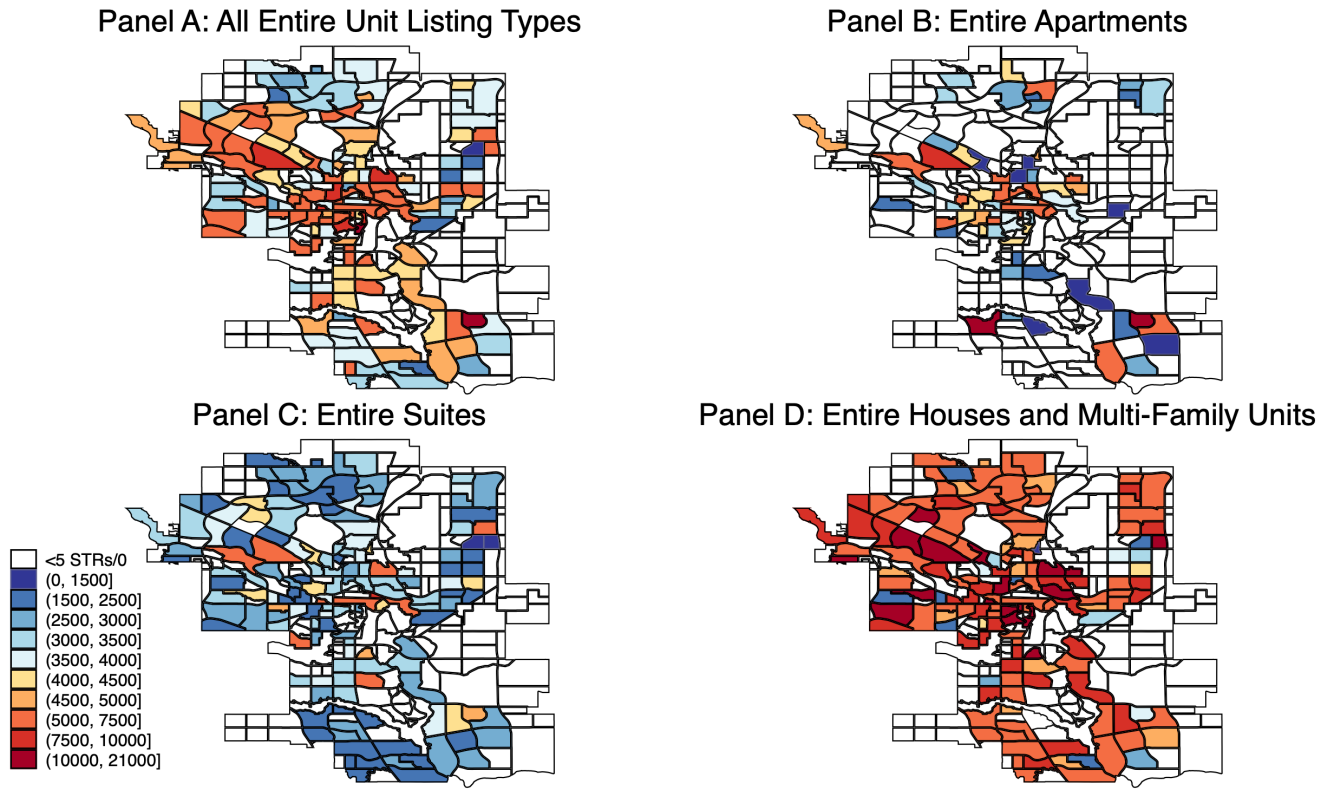- (7500, 10000]
- (10000, 21000]

Table 6: Top 10 Communities by Average Revenue per Entire Unit Active Listing, July 2023

Community	Average Revenue Per Active Listing	Sector	Community Status (2021)
NEW BRIGHTON	$12,761	SOUTHEAST	ESTABLISHED
PARKHILL	$10,146	CENTRE	ESTABLISHED
SCARBORO	$9,566	CENTRE	ESTABLISHED
ELBOW PARK	$9,439	CENTRE	ESTABLISHED
WINSTON HEIGHTS/MOUNTVIEW	$8,757	CENTRE	ESTABLISHED
ERLTON	$8,256	CENTRE	ESTABLISHED
HILLHURST	$8,171	CENTRE	ESTABLISHED
VARSITY	$7,887	NORTHWEST	ESTABLISHED
TARADALE	$7,061	NORTHEAST	ESTABLISHED
FAIRVIEW	$6,952	SOUTH	ESTABLISHED

- The total revenue earned by Airbnb and VRBO/HomeAway hosts has largely mirrored the time trends of active listings and nightly bookings: while COVID-19 interrupted the growth of total revenue, as of 2023, STR is growing again and is higher than ever. It should be noted that, while this is true, the cost of operating an STR is also higher than ever, and we cannot observe costs.
- Communities that make the highest revenue per listing on average are located primarily in centre communities but are not necessarily communities with the highest number of active listings or nightly bookings. Active listings in developing communities are not top revenue earners (on average).

2. Business License Compliance

Since STR regulations were enacted in Calgary in February 2020, STR operators are required to have a business license and post that business license number on all listings associated with that STR. In our Phase 1 report, we found that in January 2022, only 23% of all active Airbnb listings in Calgary had a business license number listed, suggesting a low compliance rate. As of summer 2023, Airbnb changed the process for creating a new STR listing in Calgary: a new listing must now complete the business license field. While Airbnb does not determine whether or not the business license entered is valid (e.g., listed with the City), it has increased compliance with both registering for a business license and with posting the business license number on Airbnb listings.

As of July 2022, there were 1,087 STR business licenses registered with the City of Calgary and 4,159 active Airbnb and VRBO/HomeAway listings. As a rough estimate, this suggests that at most 26% of active listings were licensed. This result is similar to what we found in our Phase 1 report in January 2022 when we manually checked Airbnb listings for business license postings. As of July 2023, there were 4,280 STR (active) business licenses registered with the City of Calgary, suggesting at most 75% of active listings were licensed. This is a large improvement in apparent compliance.

While the above results are for apparent compliance, we improve the accuracy of the measure of compliance by examining the active Airbnb/VRBO listings themselves and the business license numbers they are posting. As of April 2023, we have data for each Airbnb listing that includes a scrape of the business license field (note: there is no business license field for VRBO/HomeAway—an issue onto itself).

We clean the scraped field to improve potential matches,[24] and then match active Airbnb listings to the City of Calgary business license data. We then check those matches for validity.

In July 2023, there were 5,384 active Airbnb listings. Of those, 4,659 active Airbnb listings had something written into the business license field on their platform (87% of active Airbnb listings). Of those active Airbnb listings with something written into the business license field, 105 of those had declared their listing "exempt" from business license requirements (2.0% of active Airbnb listings). As we have removed all traditional tourist accommodations, the only possible reason for an exemption is that these active listings are not STR's but are long-term rentals advertising on Airbnb. We cannot verify the veracity of this; however, we provide them the benefit of the doubt and take their claim as true. Of the remaining active Airbnb listings with a business license number in their posting that are not exempt, only 4,257 (79% of active Airbnb listings) could be matched to a business license registered with the City of Calgary. Of those that could *not* be matched, the business license field included phone numbers, business id's, and fake business license numbers (e.g., BL000000, BL123456, BL131177, BL225959). Of those that we could match, 3,854 had a non-expired, non-rejected, non-cancelled license number: 403 had expired, cancelled, rejected, or not yet operational license (e.g., license issue date in August) numbers. Of the licenses we could match and which were non-expired, non-rejected, and non-cancelled, 87 of those license numbers appear to be inappropriately spanning multiple active listings (181 listings) that are not related (e.g., an entire apartment in the Beltline and an entire apartment in Bankview).[25] Overall, we estimate that 3,760 active Airbnb listings have a valid business license and that an additional 105 were exempt—a compliance rate of about 72%. This is very close to the rough compliance rate calculated previously. Figure 17 provides a visualization of this breakdown.

Figure 17: Active Airbnb Listings, Compliance with Business License Regulations, July 2023

Overall, this suggests that compliance with obtaining and posting a business license has improved substantially between January/July 2022 and July 2023. While compliance is not perfect, it is high. This is likely a result of efforts on the part of Airbnb to require hosts to enter a business license number and the efforts on the part of the City to make licensing requirements known. Compliance could likely be improved with minimal effort if other STR platforms (e.g., VRBO) were to also include a business license field.

3. A Portrait of Short-Term Rental Hosts in Calgary

An oft-reported concern is that platforms like Airbnb and VRBO/HomeAway have "commercialized" the STR market. There are two interrelated concerns. The first concern, often highlighted in public spaces such as the media and on social media, is STR hosts go out and purchase properties with the sole purpose of operating them as an STR, taking housing off the market. The worry is that individual investors and foreign investors are inflating the demand for housing and are not using that housing for permanent residents. The second concern often highlighted in the literature is the 'platformism' of the STR market: the role of Airbnb and VRBO/HomeAway is no longer to simply connect hosts and guests but rather to provide a platform that can be leveraged by professionalized hosts, such as professionalized property managers. This moves away from the 'home-sharing' narrative, whereby small individual hosts can share their underused space, to a market with market power and industry concentration held by professionalized property managers (e.g., Cocola-Grant et al. 2021). These two concerns are interlinked: as platformism of the STR market is improved, this may incentivize investors to make use of professionalized property managers to increase their profits from purchasing investment property. Overall, this can lead to two effects on the local housing market: (1) a reduction of the housing stock available for permanent residents, and (2) increased rents and housing prices.

In the remainder of this report, we look at the first effect: the reduction of the housing stock available for permanent residents. This effect can be estimated. The second effects (increased rents and housing prices) requires more sophisticated econometric modelling which is outside the scope of this report.

To look at the first effect, the idea is to identify STR listings that do not fit the 'home-sharing' narrative, and that are dedicated STRs which are not used for permanent residents at any time. Typically, three indicators are examined: the share of entire home/apartment listings, multi-listing hosts, and full-time listings, as well as the interaction between these indicators (e.g., Combs, Kerrigan, and Wachsmuth 2020; Kadi, Plank, and Seidl 2022). An oft overlooked issue in the examination of these indicators is the identification of property managers: property managers have been shown to control a large segment of the STR market in other jurisdictions (Cocola-Grant et al. 2021), and thus we include them here along with an examination of the commonly-examined indicators. In previous sections, we examined entire home/apartment listings. In this section, we focus on hosts. In the next section, we focus on full-time listings, and, to conclude, we examine the interaction between these.

To examine the concern of commercialization, we begin by looking at hosts and their profiles. We first use a novel method to examine who the current hosts are (e.g., what is their "host type"). As suggested,

property owners may use professional property managers to manage their STR listings, and those property managers may be listed as the host on STR platforms such as Airbnb and VRBO/HomeAway. We manually examine and categorize hosts as individuals or property managers to measure the extent of property manager operations in the market. However, these results should be approached with caution. While we manually categorize hosts into property managers and individuals, and thus we believe we improve on the existing data analysis, our approach still faces a methodological issue. It is possible that property managers do not have a host profile or host id on the STR platforms. That is, their listings may appear to belong to single-listing individuals/hosts with the host id belonging to the property owner. For example, Cocola-Grant et al. (2021) find that in the case of Porto Concierge, a professional management firm in Portugal, they manage over 700 STR listings yet do not have an Airbnb host id. The degree of professionalization is likely higher than what we are able to document despite our novel approach.

Second, we examine the more common indicators of "multi-listing hosts". That is, we examine how many hosts operate multiple listings. Again, we use a novel approach by using our manually re-coded listing type, combined with information on communities and business licenses. This ensures we are conservative in categorizing a host as a multi-listing hosts. We further include hosts with multiple private room listings as multi-listing hosts as it is possible these are "ghost hotels" where all the rooms in a dwelling are part of an Airbnb hotel. Multi-listing hosts are more likely to be "commercialized" hosts as it is likely that these hosts do not live in one or all of the STR listings they operate: this suggests they have bought one or more properties for the sole purpose of listing them as an STR.

Finally, we nuance our multi-listing host results by examining the host type of multi-listing hosts. Some hosts that operate multiple STR listings are potentially property managers: they themselves do not own nor rent the property underlying the listing, rather they manage the listing on the owner's or renter's behalf. As suggested, these hosts are not necessarily going out and buying up properties with the sole intent of running them as an STR. However, they may be encouraging commercialization of the STR market in that they incentivize potential investors to purchase STR-dedicated properties. This helps us measure the level of platformism of the STR market in Calgary.

As suggested, to do this analysis, we take a novel approach to the data. We manually examine every Airbnb host with an active listing in Calgary. Based on this manual inspection, we categorize hosts into the following:

- Individuals: This is the default type. If there is not indicator to categorize the host as a corporate host, property manager, or associated with a traditional tourist accommodation, they are categorized as an individual.
- Property Manager: Manages listings on behalf of the owners but does not themselves own the property in the listing. There must be a clear indication in the profile or on their website (if applicable) that they are managing for others.
- Other:
  - Hosts that are corporations but are not a traditional tourist accommodation (hotel/motel/inn/B&B/lodge, etc.) or property managers; OR
  - Host that are online agencies (e.g., Red Awning) that offer vacation packages that include the rental of an STR

We also manually identified hosts with more than one host account. While this process is not perfect, it allows us to allocate listings across multiple host accounts to one host, particularly for those hosts with a significant number of STR listings. It should also be noted that in this analysis, VRBO/HomeAway listings were removed because hosts do not have to identify themselves on VRBO/HomeAway: only Airbnb hosts and listings are included.

3.1 Host Profile: Property Managers

In July 2023, there were 3,034 unique hosts operating 5,385 active Airbnb listings in Calgary, averaging to about 1.8 listings per host. However, this differs by host type and month. Figure 18 shows the number of hosts by host type (right panel) and the average number of listings by host type (left panel) for active listings in Calgary from January 2017 to July 2023 (for those we could identify/had not taken down their profiles at the time of manual checking). We see that individual hosts make up the majority of Airbnb hosts at any given time; however, they also operate the fewest average number of listings (1.6 in July 2023). Property managers are far fewer in number (115 in July 2023); however, as of summer 2021, they operate the highest average number of listings in any given month (5.98 in July 2023). While the average number of listings for both individuals and property managers have increased over the time period examined, the average number of listings for property managers has experienced the strongest growth in absolute terms, increasing from 2.09 listings to 5.98 listings (186% increase).

Figure 18: Hosts of Active Airbnb Listings, Calgary, January 2017 - July 2023
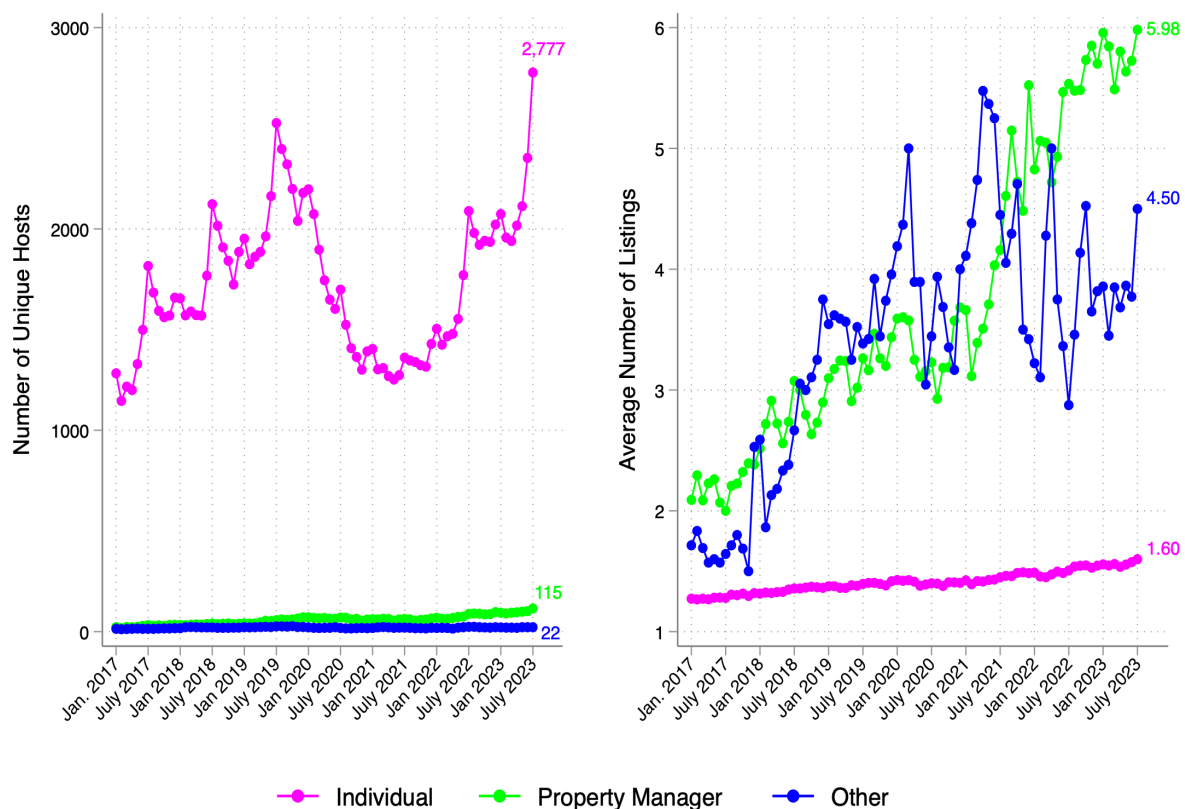
To examine the share of the market held by the different host types, Figure 19 shows, in Panel A, the percent of hosts by host type. Panel B shows the percent of active Airbnb listings operated by different host types, and Panel C shows the percent of Airbnb revenue by host type. All graphs range from January 2017 to July 2023. Figure 19 shows that while property managers make up a small share of hosts (3.8% in July 2023), the operate a disproportionate share of listings (12.8% in July 2023) and earn a disproportionate share of the revenue (19.5% in July 2023). Furthermore, over time, the share of the Airbnb market controlled by property managers has been increasing slowly despite some minor seasonal fluctuations. Together, these graphs suggest a non-negligible role of property managers in the Calgary Airbnb market. These numbers likely understate the control of the Airbnb market by property managers as it is likely most property managers do not have a unique Airbnb host id but manage the individual host id of the property owner.

Figure 19: Proportion Airbnb Market by Host Type, Calgary, January 2017 - July 2023
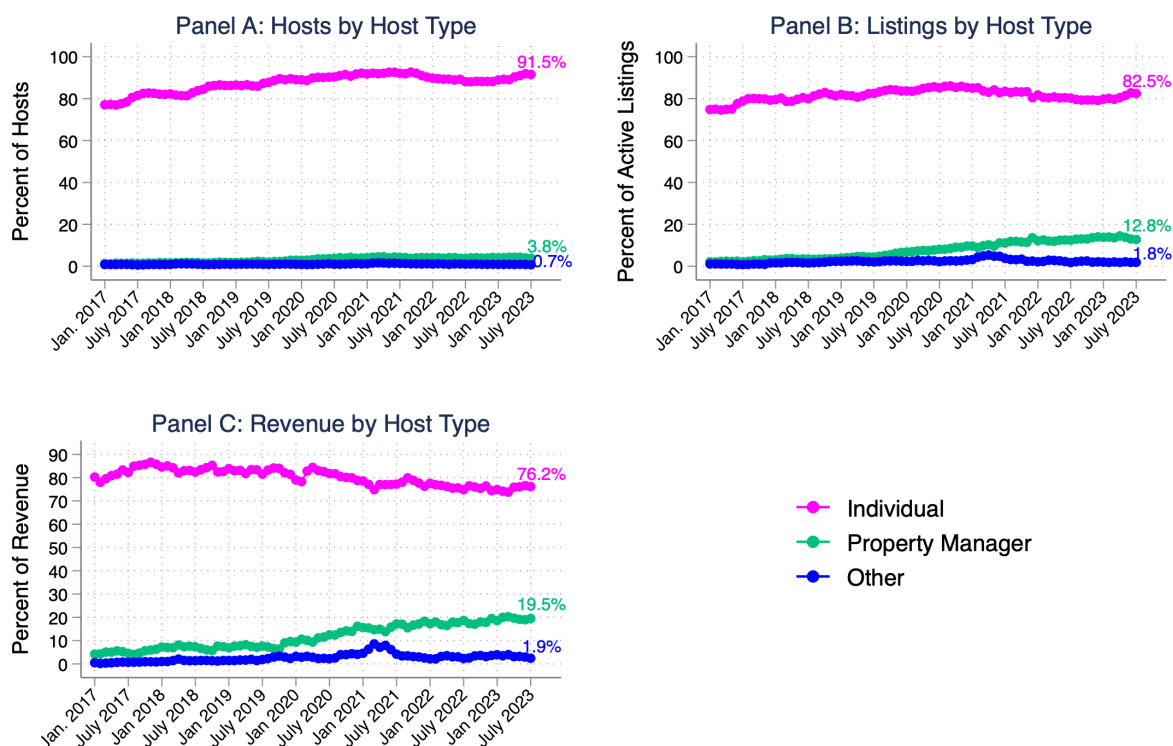
3.2 Multi-Listing Hosts

While we now have a better understanding of who Calgary hosts are, we next turn our attention to multi-listing hosts. In the literature, a multi-listing host is defined as a host that operates two or more (self-described) entire home/apartment STR listings or three or more (self-described) private rooms (Combs, Kerrigan, and Wachsmuth 2020, 13). However, we find this definition problematic. As argued previously, hosts often mis-categorize their own STR listing or create a variety of listings for the same property. For example, for a two-bedroom basement suite, there could be a listing for an "entire home/apartment"

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that includes only one bedroom of the basement suite and another "entire home/apartment" listing that includes both bedrooms in the basement suite. This host would be identified as a multi-listing host in the literature; however, it is likely that this is not a commercial operation. The host could live on the main floor and occasionally use the basement suite for their own purposes: it is more likely an increase in the use of an otherwise underused space.

We conceptualize a multi-listing host as a host that has a least one dedicated STR that they could not possibly use as their primary residence and where the host cannot be a live-in host. For example, if a host has two entire apartment listings, it is possible that one of the apartment listings is their primary residence, but the second listing cannot be their primary residence and is more likely to be a dedicated STR, thus they classify as a multi-listing host. Further, a host that lists both an upper suite and a basement suite in a house may use the upper suite as their primary residence. Since the host may be a live-in host, this host does not classify as a multi-listing host.

To operationalize this conceptualization of a multi-listing host, we construct two types of multi-listing hosts. The first type must have two or more entire units of any kind (e.g., single detached house, multi-family unit, apartment, suite) AND have STR listings in different communities OR have different business license numbers for their listings. For example, if a host lists two basement suites and the suites are located in different communities (e.g., one in Seton and one in Livingston), the host may use one of the private dwellings where one of the suites is located as their primary residence, but this could not apply to both suites: at least one suite is a dedicated STR where the host is not a live-in host. The second type of multi-listing host must have four or more private rooms. These private rooms can be in the same community/have the same business license number. This is intended to capture the Airbnb hotels. We increase the number of private rooms to four (compared to three in the literature) to be a multi-listing host as 31% of private dwellings in Calgary have 4+ bedrooms: using a benchmark of three may overestimate multi-listing hosts based on private rooms given the prevalence of 4+ bedroom houses in Calgary.

Thus, a multi listing host must meet the following conditions:

- Two or more entire apartment listings, entire single detached house listings, entire suites, and/or entire multi-family unit listings;

AND

- Of the multiple listings identified, they must be in two or more different communities in Calgary,
- OR have two or more different business license numbers.

OR

- Four or more private rooms.

Note that for the listing type, these are our manually re-categorized listing types and not the self-described listing types provided by the hosts due to the misspecification of listing types by hosts. This limits us to only examining April 2023 to July 2023. Further, we only use Airbnb hosts as we found that in

some instances, there may be two listings (one Airbnb, one VRBO) for the same listing: the host has not property synched their listings and the AirDNA scrape treats them as separate listings. We remove the VRBO/HomeAway listings so that multi-listing hosts are not overcounted (given that VRBO has much fewer listings than Airbnb). Finally, this is a conservative definition of multi-listing host, but it does pick up the hosts that very clearly are operating multiple STR's, and not just advertising one property as multiple different listings.

Using this method, Figure 20 plots the percentage of Airbnb hosts in Calgary that are multi-listing hosts (blue bar), the percentage of listings held by multi-listing hosts (red bar), and the percentage of revenue earned by multi-listing hosts (green bar). Figure 20 shows that while relatively few hosts are multi-listing hosts (11.9% in July 2023), they hold a disproportionately large share of listings (41.3% in July 2023) and earn a disproportionately large amount of the total revenue (51.9% in July 2023).

Figure 20: Multi-Listing Hosts, Calgary, April 2023 - July 2023
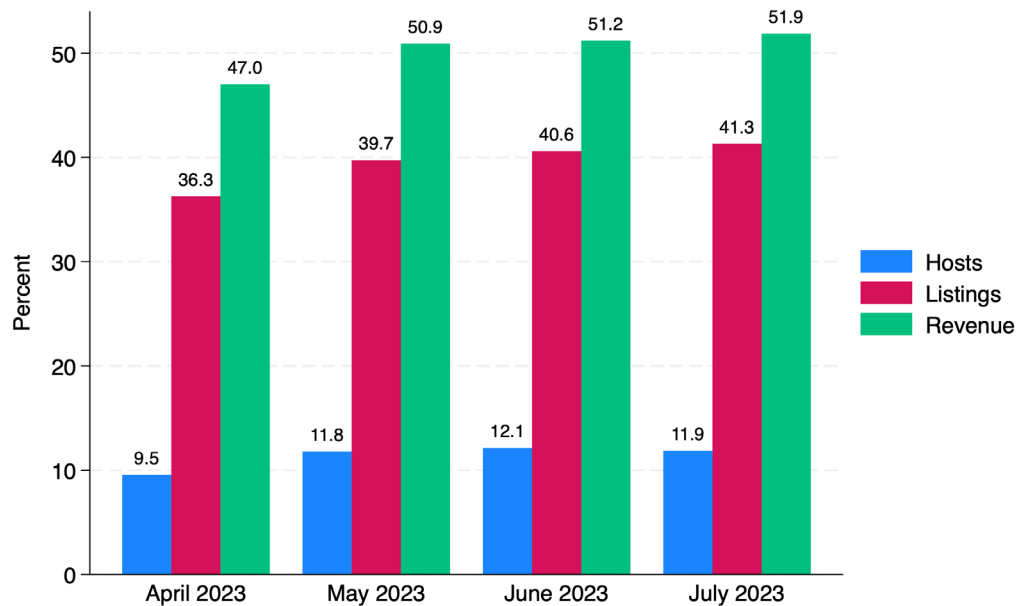
The percentage of multi-listing hosts is larger in 2023 than what was found in our Phase 1 report. In the Phase 1 report, we reported that 7.7% of hosts were multi-listing hosts in June 2021. However, these numbers are not comparable. We used different techniques to determine whether a host is a multi-listing host or not. In the Phase 1 report, we counted a host as a multi-listing host if they had two or more self-described entire home/apartment rentals. Here, we use our re-coded listing types and we apply a second condition of having listings in separate communities or separate business license numbers. Although the numbers are not comparable, the technique used here is more conservative than that used in the Phase 1 report. This suggests that multi-listing hosts have substantially increased and increased their control of the STR market in Calgary since June 2021.

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3.3 Multi-Listing Hosts and Host Type

As we have documented, multi-listing hosts in Calgary operate a disproportionally large percentage of listings and earn a disproportionally large percentage of total revenue. To examine to what extent this is a result of platformism, we examine multi-listing hosts by host type: how many are individuals and how many are property managers?

Figure 21 shows these statistics for multi-listing hosts in Calgary. Panel A shows the percent of multi-listing hosts by host type. Panel B shows the percent of listings held by multi-listing hosts by host type. And Panel C shows the percent of revenue earned by multi-listing hosts by host type. Note that for all, the denominator only includes hosts/listings/revenue by multi-listing hosts and omits hosts/listings/revenue by non-multi-listing hosts.

Figure 21 shows that the majority of multi-listing hosts are individuals (80% in July 2023) and they hold the majority of listings held by multi-listings hosts (68% in July 2023) and earn the highest percentage of revenue earned by multi-listing hosts (61% in July 2023). A smaller percentage of multi-listing hosts are property managers (16% in July 2023), but they hold a disproportionately high share of listings held by multi-listing hosts (28% in July 2023) and earn a disproportionate large amount of revenue earned by multi-listing hosts (34% in July 2023). These percentages for property managers have been decreasing since April 2023.

These results suggest that platformism is playing a role in the Calgary STR market: Airbnb is being leveraged by professionalized hosts, such as professionalized property managers. However, this role of Airbnb is either declining or professional property managers are becoming more likely to post their listings as individual hosts (e.g., using the host id of the property owner instead of their own).

Figure 21: Multi-Listing Hosts by Host Type, Calgary
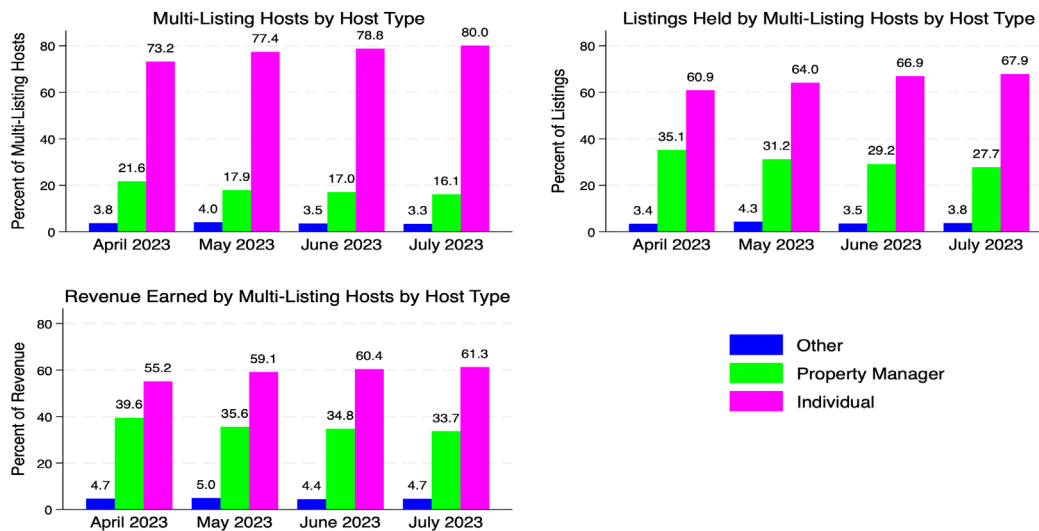
A Portrait of Short-Term Rental Hosts in Calgary: Summary

- The majority of Airbnb hosts in Calgary are individuals who operate, on average, 1.6 listings per host. Property managers, while fewer than individual hosts, operate more listings per host (about 6 per host).
- Multi-listing hosts make up a small share of hosts in the Calgary market but control a significant share of the market: 12% of hosts are multi-listing hosts, and they earn 52% of the revenue.
- Of multi-listing hosts, the majority are individuals. Property managers make up a smaller share of multi-listing hosts and their share of the market has been declining. This may be due to the declining role of property managers or a change in the way property managers market their listings.

6.   Full Time Listings: A New Approach

In examining the commercialization of the STR market, along with multi-listing hosts, full-time listings are also typically examined. Full-time STRs are defined as STRs that are booked and available for some period of time. Wachsmuth et al. (2017, 22) suggests a full-time listings is booked for 60 days per year and available or booked 120 days per year, while more recent literature suggests a full time listing is booked for 90 days per year and available or booked 183 days per year (Wachsmuth 2023). As the argument goes, full-time STR units remove housing from the market (Wachsmuth et al. 2017). The problem with this argument is that the subjective thresholds of 60/90 days booked and 120/183 days available may not accurately reflect a full-time STR. Particularly, in a city like Calgary, some residents may be scholars who visit other post-secondary institutions for a term (4 months or 120 days) and list their primary residences in Calgary for the term they are gone. Other residents may choose to live in warmer climates during the winter months, and, while they are away for those few months, list their primary residence as a STR. Regardless of the exact reason, the 60/90 days booked and 120/183 days available threshold that defines a full-time STR may be too low a threshold for full-time STRs. Arbitrarily setting some threshold does not take into account seasonal patterns and culture, which may differ by geographical location.

A second problem with this definition of full-time STRs is that it attempts to combine distinct dimensions of duration: spells and spell duration. A spell is a continuous period of time spent in a certain condition. With respect to STR's, a spell is a continuous period of time listed as an STR. An STR listing may be listed for multiple spells, coming on and off of STR platforms. The second attribute is spell duration: the length of time spent in a single spell. For STR's in our data, we use two measures of spell duration. First, we use the number of months an STR is actively listed/available to be booked/is booked on an STR platform within a distinct spell. When a new spell starts, spell duration begins at one. However, an STR is not necessarily

booked/available to be booked all days of a month. Thus, second, we use the average number of days an STR is booked/available to be booked during a distinct spell.[26]

These separate dimensions are important because they demonstrate different patterns of use. For example, while an STR may be actively listed for 120 days in the last year, those 120 days may be spread over 12 different spells of 10 days each, or they may be concentrated into one spell. The first example (12 spells over 10 days) could be a shift worker who works in the oil sands listing their primary residence while they are away at work. The second example (one spell of 120 days) could suggest a person who leaves Calgary for a four-month summer vacation and lists their primary residence while they are away. Moreover, refuting the argument made in the literature, it is likely that neither of these STRs would become long-term rentals (LTRs) and it is unlikely that these STRs are removing housing from the LTR or owner-occupied market. By combining spells and spell duration into one indicator, e.g., 60 days booked/120 days available, this pattern of use is overlooked, and likely overstates how many units are potentially removed from the housing market by STRs.

We address these issues by using a cluster analysis to remove the arbitrariness of setting a full-time threshold, and which takes into account different dimensions of duration. We let a computer algorithm determine, based on the patterns of past and present STR listings, what constitutes a "full-time" STR (which we call "permanent"). For our cluster analysis, we follow the method popularized in Kuhn and Culhane (1988) and used in Aubry et al. (2013), that used a cluster analysis to assess typology and patterns of homelessness. We apply this method to STR listings in the City of Calgary and the City of Edmonton to assess STR typology and patterns of STR listings.

We hypothesize that there are four distinct typologies of STR listings.

1. Temporary: these have few spells, shorter spell durations of fewer months with fewer days booked/available to be booked per month. These are more likely to be people taking advantage of their own (temporary and not always re-occurring) vacation plans to list their house as an STR, e.g., during Stampede, or over (week-long/two week) summer or Christmas holidays.
2. Term: these STRs have few spells with a mid-length number of months per spell and more days booked/available to be booked per month. These may be snow birds who leave colder Canadian climates for the winter, or academics or other occupations/industries who leave Calgary for a term or season, and these are not necessarily re-occurring.
3. Shift: these STRs have many spells with a mid-length number of months per spell and fewer days on average per month where the listing is booked/available to be booked. These may be shift workers (e.g., oil sand workers or airline stewards) who are out of town for reoccurring, short shifts.
4. Permanent: these are "full-time" or "entrenched" STRs with only a few spells, but each spell is of a long duration for many months with close to 30 days where the listing is booked/available to be booked per month.

Of these, the first three (temporary, terms, shifts) are unlikely to be properties that would be used for long-term rentals if STRs were banned: they are non-permanent listings. They are more likely to be used

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[26] Due to the set-up of our data, we cannot create spells based on the continuous number of days booked/available to be booked. Instead, we create spells based on the continuous number of *months* listed and include in the cluster algorithm the average number of days a listing is booked/available to be booked within a month.

as a residence for the property owner/renter when it is not listed as an STR. The permanent listings are more likely to be used as a long-term rental if STRs were banned: they are less likely to be used as a residence for the property owner/renter.

6.1 Method

We use the longitudinal nature of the AirDNA data, composed of Calgary and Edmonton active Airbnb and VRBO/HomeAway listings from August 2015 to July 2023. We make corrections for both right and left censoring. For left censoring, we remove STRs that were "created" before August 2015. We can only do this for Airbnbs but not for VRBO's (VRBO's do not have a "created" date). As a robustness check, we remove VRBO's. Left-censoring bias would cause some STRs to show much less "active" time than they do: it could show episodic or permanent STRs as transitory by missing unrecorded days and episodes. Similarly, to account for right censoring, we remove STRs who entered the system at least 1 year before July 2023 (the end of the data), allowing each STR to have at least one year of exposure. Finally, "duration" is counted at the month level as this is how our data is structured.

Cluster analysis uses nearest centroid sorting based on Euclidean distance to construct unique clusters given a specified number of clusters (four in this case). This provides robust and well-defined divisions between groups. We use Stata's "cluster" command with k-means clustering (e.g., an iterative process) and the standardized values of total spells, total duration (in months), and average spell duration (in months) per spell. Standardized values (to a mean 0 and standard deviation of 1) are used as opposed to actual values because average spell duration has a wider range and higher maximum value compared to total spells. Standardization ensures that the variables are scaled similarly and have equal weighting in the cluster analysis. Cluster analyses was conducted based on the hypothesis that the optimal solution would yield three distinct clusters of STR listings, each with the specific pattern as suggested above. After the STR listings are clustered into a group, we use a MANOVA test to test whether total spells, total duration (in months), and average spell duration (in months) are statistically significantly different between clusters. Finally, we end by comparing the generated clusters on their listing characteristics variables that are available in either the property or monthly files.

6.2 Results

Overall, the cluster analysis produced four distinct groups of Airbnb and VRBO/HomeAway listings with the characteristics as expected. The different characteristics of the groups are reported in Table 7. Term listings in both Calgary and Edmonton make up the majority of listings: 48 - 51% of listings in both cities are term listings. They generally experience just under 2 spells with each spell being an average of just over 5 months per spell and are booked or available to be booked an average of 27 days per month.

Table 7: Cluster Analysis Results, All Unique Active Listings from Aug. 2015 - July 2023 created after Aug. 2015 and on or before July 2022[27]

	Temporary		Term		Shift		Permanent	
	Calgary	Edmonton	Calgary	Edmonton	Calgary	Edmonton	Calgary	Edmonton
Number (%) of Unique Listings	5,318 (31%)	2,510 (29%)	8,597 (48%)	4,342 (51%)	1,679 (10%)	770 (9%)	1,789 (10%)	959 (11%)
Number of Spells (mean (S.D.))	2.2 (1.1)	2.2 (1.0)	1.6 (0.8)	1.5 (0.7)	6.6 (1.9)	6.6 (2.0)	1.4 (0.7)	1.3 (0.6)
Average number of months per spell (mean (S.D.))	3.8 (3.0)	4.3 (3.4)	5.2 (3.7)	5.6 (4.1)	4.8 (2.7)	5.1 (2.7)	23.9 (10.3)	26.0 (11.2)
Average Number of Days Available + Booked in a month (mean(S.D.))	15.6 (4.7)	15.6 (4.7)	26.9 (3.0)	26.9 (3.0)	17.7 (4.6)	17.6 (4.4)	25.7 (3.7)	26.2 (3.5)

Temporary listings make up between 29-31% of listings in Calgary and Edmonton. In Calgary, these are only temporarily on the market, averaging two spells per listing for a duration of 3.8 months and 16 days of availability per month. These can be thought of as listings that hosts may put onto the market during Stampede or during Christmas holidays when they leave town for their own vacations.

Shift listings are less common than term and temporary listings. They make up between 9-10% of listings in Calgary and Edmonton. In Calgary, shift listings appear to come on and off the market more frequently than any other type of listing. On average, they experience 7 spells of an average duration of 5 months and are booked or available to be booked an average of 18 days per month.

Finally, permanent listings make up the smallest proportion of listings in both Calgary and Edmonton—between 10% and 11% of all listings ever created from August 2015 to July 2022. Permanent listings in Calgary experience on average 1.4 spells of an average duration of 24 months. During that time, they are booked or available to be booked an average of 26 days per month. These listings can be thought of as full-time listings: these are listings that are always listed on the STR market, are the least likely to be used as a permanent residence by the host/property owner and are the most likely to be returned to the housing market (as a long-term rental or owner-occupied) if STRs were banned.

Using the cluster type identified above, Figure 22 plots the number of active listings by cluster type (left panel) and the percent of active listings by cluster type (right panel) for Calgary and Edmonton. These figures run from January 2017 to July 2022. Only Airbnb and VRBO/HomeAway listings that were created on or before July 2022 were included in the analysis. Airbnb and VRBO/HomeAway listings created after July 2022 were removed. This removal skews the visualization and may lead to incorrect conclusions.

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[27] Note that we re-ran this without listings that were only VRBO's (with no "created date" information available). The percentage across types was very similar. In particular for Calgary, 27% were temporary, 49% were term, 14% were shift, and 10% were permanent. Likewise, number of spells, spell duration, and total duration were all similar.

Figure 22 shows that in Calgary, term listings are the most frequent type of listing; however, they declined (in percent) from January 2017 to early 2022 and were particularly hard hit during the COVID-19 pandemic. As COVID-19 restrictions lifted, term listings increased in number and percent. Temporary and shift listings move in a similar pattern over time, increasing in number and percent from January 2017 until the onset of the COVID-19 pandemic. During the pandemic, temporary listings declined significantly while shift listings also declined but not by as much. This may be due to the continued requirement that travel for shift work more-or-less continue whereas travel for tourism-related purposes was more severely curtailed (decreasing temporary listings). As pandemic restrictions have lifted temporary listings have again increased (in number and percent) whereas shift listings have stagnated (in number) and declined (in percent) as workplaces adjust to post-COVID work (e.g., increased work from home, etc.). With respect to seasonal trends, temporary, shift, and term listings show strong seasonal patterns, with spikes in Stampede months (July) and smaller spikes in December.

In Calgary, permanent listings grew over 2017 to 2019 and, despite a decline during the COVID-19 pandemic, are once again increasing. From about May 2020 to April 2022, there were more permanent listings than temporary listings or term listings. This pattern changed in early 2022, when term listings became more numerous than permanent listings again. As of July 2022, there were 867 permanent listings—21% of all active listings in that month. Permanent listings show weak seasonal trends, with no spikes in Stampede months.

Overall, these results suggest that although permanent listings in Calgary are far fewer than non-permanent listings, they are increasing. We hypothesize that, if left unchecked, they will continue to increase. These listings are the most likely to be removing housing from the housing market. On the other hand, temporary, term, and shift listings are far greater in number and percent (79% in July 2022), suggesting that, currently, the majority of STR listings are not removing housing from the housing market.

Full-Time Listings – A New Approach: Summary

- The majority of Airbnb and VRBO/HomeAway listings in Calgary are term listings (48%), experiencing few spells (2) of short duration (5 months) on the STR market. Temporary and shift listings also make up a large amount of listings (31% and 10%, respectively).
- Term listings, temporary listings, and shift listings show strong seasonal patterns. Term listings and temporary listings were very negatively impacted during COVID, but have been recovering since.
- Term listings, temporary listings, and shift listings are the least likely to be removing housing from the housing market: they are the most likely to be permanent residences or used for other, non-STR purposes.
- A much smaller percent of Airbnb and VRBO/HomeAway listings in Calgary are permanent listings (10%) experiencing few spells (1.6) of very long duration (24 months) on the STR market.
- Permanent listings show weak seasonal variation, were not as negatively impacted by the COVID-19 pandemic, and have been increasing since, reaching 867 (21%) active listings in July 2022.
- Permanent listings are the most likely to be removing housing from the housing market: they are the least likely to be permanent residences or used for other, non-STR purposes.
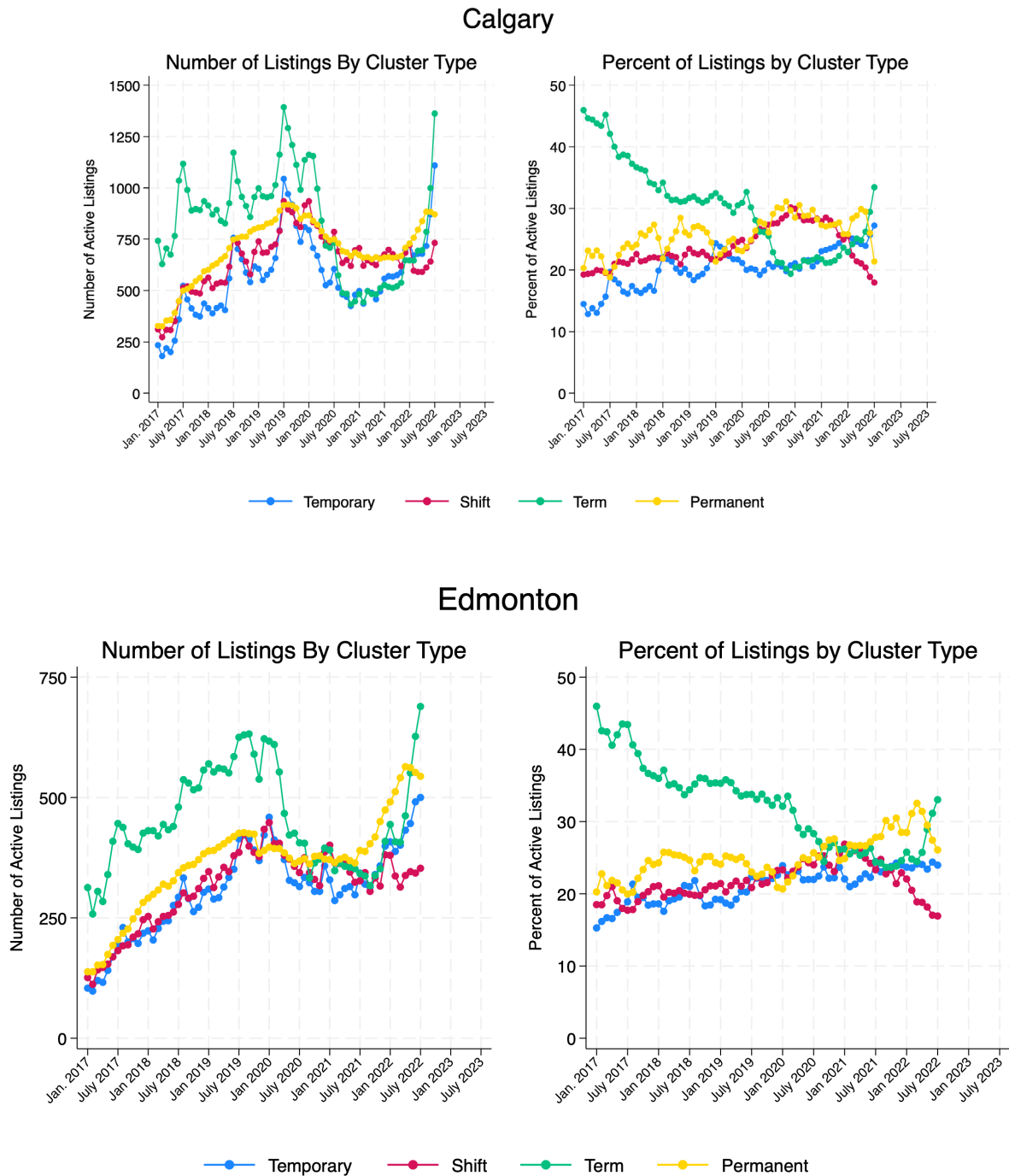
7. Impact on the Housing Market

Given what we have seen with multi-listing hosts and permanent listings, the next (and final) step of our commercialization analysis is to consider the impact of STRs on the housing market in Calgary. In particular, we estimate how many STRs are potentially displacing potential permanent residents. To do this, we estimate the number of current Airbnb and VRBO/HomeAway listings that, if they were not used as an STR listing, they would be used as a long-term rental (LTR) or returned to housing market (e.g., sold to another, owner-occupied, etc.). That is, we estimate how many Airbnb and VRBO/HomeAway listings are dedicated STRs.[28]

Our estimate is conservative: we take Airbnb and VRBO/HomeAway listings that are either permanent (as discussed in the previous section) and/or listed by a multi-listing host (as discussed in a previous section). For reasons already argued, these units are the most likely to be dedicated STRs for which property was bought with the sole intention of using it as an STR and/or is consistently listed on an STR platform. This estimate is conservative because we examine only the month of July 2023. In July 2023, we are unable to classify all listings as permanent, temporary, term, or shift (as explained in the previous section). However, we can classify 2,810 of them (out of 5,698, about 49%). For those we cannot classify, because they have not been on the market long enough, they are more likely to be non-permanent listings than permanent listings. Furthermore, we can only classify hosts as multi-listing hosts if they are an Airbnb host and their host profile was accessible (4,975 out of 5,698, 87%).

Despite these classification issues, we find that 1,580 listings are permanent listings and/or are listed by a multi-listing host. That is, at least 28% of active Airbnb and VRBO/HomeAway listings in July 2023 in Calgary are listings that could potentially be returned to the housing market if STRs were banned. As a percent of private dwellings, this suggests that 0.29% of all private dwellings in Calgary (as of Census 2021) are dedicated STRs. Further, of these, 1,204 were entire units (entire apartments, entire single detached homes, entire multi-family units, or entire suites).

Using a different method, Combs, Kerrigan, and Wachsmuth (2020) estimate that, in Toronto in 2018, 7,000 listings (0.3% of private dwellings) are frequently rented entire home listings (FREH) and 2,900 listings (0.1% of private dwellings) are very frequently rented entire home listings (VFREH) and that these are removing housing that would otherwise be on the long-term rental market.[29] This suggests that while Toronto had more FREH listings, as a percent of private dwelling, Calgary and Toronto have the same percentage of FREH's/commercialized listings (although note the methods used are different).

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[28] This is only one channel of impact on the LTR rental: looking at how many STRs may be converted to LTRs, and is amenable to estimation through the methods described. The other channel of impact on the LTR rental is how STRs affect the value of the housing stock. This requires econometric modelling which is outside the scope of this report, and which, as far as we are aware, has not been done in Canada (although it has been done in the US).

[29] They also estimated there were 1,000 FREH listings and 400 VFREH listings in Calgary in 2018.

7.1 Spatial Distribution

Despite there being a sizable number of listings that are permanent listings and/or are listed by a multi-listing host (i.e., dedicated STR) in Calgary, they are geographically concentrated. Figure 23 shows the number of dedicated STRs by community and Table 8 shows the top 10 communities by number of dedicated STRs, both for July 2023.

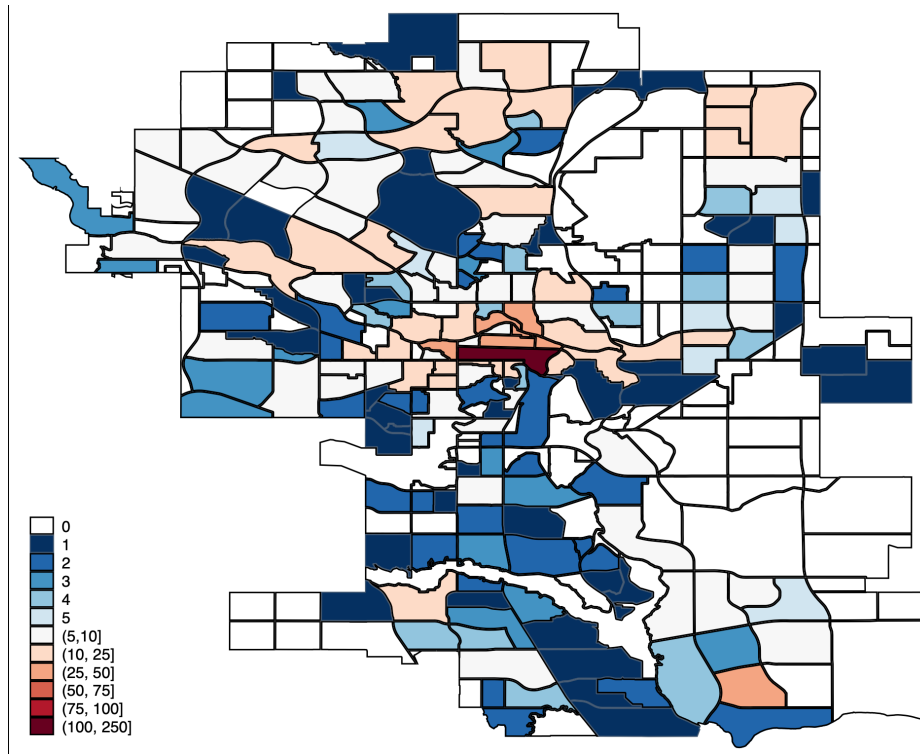*Figure 23: Dedicated STRs by Community, July 2023*

Table 8: Top 10 Communities by Number of Dedicated STRs, July 2023

Community	Number of Dedicated STRs	Sector	Community Status (2021)
BELTLINE	245	CENTRE	ESTABLISHED
SUNNYSIDE	37	CENTRE	ESTABLISHED
DOWNTOWN COMMERCIAL CORE	36	CENTRE	ESTABLISHED
CHINATOWN	36	CENTRE	ESTABLISHED
SETON	33	SOUTHEAST	DEVELOPING
CRESCENT HEIGHTS	31	CENTRE	ESTABLISHED
DOWNTOWN EAST VILLAGE	27	CENTRE	ESTABLISHED
SUNALTA	26	CENTRE	ESTABLISHED
BANKVIEW	25	CENTRE	ESTABLISHED
BRIDGELAND/RIVERSIDE	25	CENTRE	ESTABLISHED

As before, centre communities in general have the highest number of dedicated STRs. However, the Beltline has 208 more dedicated STRs than the second-place community, Sunnyside. Developing communities do not have as many dedicated STRs; only Seton made the top 10 with 33 dedicated STRs. However, the lower numbers in developing communities may be due to the shorter period of time that these STRs have been on the market, precluding categorization as a permanent listing using the methods discussed.

8.   Conclusion

The purpose of this report was to set out a current, detailed portrait of the short-term rental market in Calgary. Overall, the main take-aways are:

- While the COVID-19 pandemic interrupted the STR market in Calgary, since late 2022 the STR market has rebounded and is growing at pre-COVID rates.
- Some communities are more impacted by STR activity than other communities. These include centre communities such as the Beltline, Crescent Heights, and Sunnyside, and developing communities such as Seton, Livingston, and Cornerstone.
- Activity across communities differs. Centre communities are more likely to have entire apartment listings and more STR-related complaints, while developing communities are more likely to have basement suites.
- The majority of STR listings in Calgary are compliant with business license requirements—they have a business license number and it is posted in their STR listing (70%).
- Most STR hosts in Calgary are individuals who operate fewer than two listings. A small but non-negligible number of hosts are also property managers, operating listings for property owners. However, there are a small number of hosts who are multi-listing hosts (who are not property managers). They control a disproportionately large share of the Calgary STR market, and are the most likely to be purchasing property for the sole purpose of operating it as an STR.
- Most STR listings in Calgary are non-permanent listings (~90%). A small number of listings are permanent listings and are the least likely to be used as a permanent residence, removing housing from the housing market.
- Overall, around 1,580 or 28% of all STR listings in Calgary in July 2023 were listed by a multi-listing host and/or were a permanent listing. These are the units most likely to be returned to the housing market if STRs were banned in Calgary. This indicates that the majority of STR listings are non-permanent listings or listed by hosts with fewer than three listings.

Overall, the Calgary STR market is vibrant and growing. In general, we see compliance with regulations and consistent, but not exponential, growth. While Calgary appears to have done an admirable job of keeping the STR market under control, now is a good time to review regulations to ensure that it stays this way, particularly as Calgary grapples with related policy issues such as affordable housing.

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