Short-term rentals in Canada

A two-part approach to analyzing Airbnb activity

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Abstract

In the last several years, Airbnb and other short-term rental (STR) services have grown precipitously across Canada, but very little is known about the scale and character of this activity or its impact on housing. This study presents a two-part approach to short-term rental investigations which includes: (1) a comprehensive examination of short-term rental markets with a focus on the types of rentals which comprise the market and their effects on housing, and (2) a lifecycle analysis that demonstrates how the behaviors of a market's constituent listings can be expected to vary throughout their lives. The subsequent findings can be leveraged by planners and policymakers to proactively tailor short-term rental regulations to prevent the anticipated negative externalities associated with their specific STR market. Relying on spatial analysis of big data, this study applies this approach to evaluate the Canadian Airbnb market. Airbnb activity is highly concentrated geographically—nearly half of all active listings are located in the Toronto, Montréal and Vancouver metropolitan areas—and highly concentrated among hosts, the top 10% of whom earn a majority of all revenue. Contrary to the rhetoric of "home sharing", almost 50% of all Airbnb revenue last year was generated by commercial operators who manage multiple listings. Moreover, 31,000 entire homes were rented frequently enough last year that they are unlikely to house a permanent resident. This housing pressure disproportionately affects West Coast cities. While current Airbnb activity is concentrated in major cities, active listings, total revenue, hosts with multiple listings, and frequently rented entire-home listings are all growing at substantially higher rates in small towns and rural areas. The results of the lifecycle analysis reveal that patterns of activity vary predictably along a number of dimensions related to a listing's type, location, and occupancy-rate status. This suggests that, if armed with knowledge of the basic characteristics of STRs within their jurisdiction, planners and policymakers can effectively predict the evolutionary patterns of their local STR market and develop targeted regulatory frameworks.

Résumé

Au cours des dernières années, Airbnb et d'autres services de location à court terme (LCT) ont connu une croissance démesurée partout au Canada, mais l'on connaît très mal l'ampleur et le caractère de cette activité ou son impact sur le logement. Cette étude présente une approche en deux parties des enquêtes sur les loyers à court terme, qui comprend: (1) un examen complet des marchés de location à court terme en mettant l'accent sur les types de loyers qui le composent et leurs effets sur le logement, et (2) une analyse du cycle de vie qui montre comment les comportements des logis qui constituent un marché peuvent varier au cours de leur vie. Les urbanistes et les fonctionnaires attachés à la création de politiques publiques peuvent s'inspirer des conclusions suivantes pour adapter les règles de location à court terme afin de contrer les externalités négatives associées au marché des LCT. En s'appuyant sur l'analyse spatiale du big data, cette étude applique cette approche pour évaluer le marché canadien Airbnb. L'activité d'Airbnb est très concentrée géographiquement. En effet, près de la moitié des annonces actives sont situées dans les régions métropolitaines de Toronto, Montréal et Vancouver, et sont fortement concentrée chez les hôtes, les premiers 10% réalisant une majorité de tous les revenus. Contrairement à la rhétorique du «partage de domicile», près de 50% des revenus d'Airbnb l'année dernière ont été générés par des opérateurs commerciaux qui gèrent plusieurs annonces. De plus, 31 000 logements entiers ont été loués assez fréquemment l'année dernière pour qu'il soit peu probable qu'ils hébergent un résident permanent. Cette pression du logement affecte de manière disproportionnée les villes de la côte ouest. Alors que l'activité Airbnb actuelle est concentrée dans les grandes villes, les annonces actives, les revenus totaux, les hôtes possédant plusieurs annonces et les annonces de location de logement complets fréquemment louées s'étendent à des taux considérablement plus élevés dans les petites villes et les zones rurales. Les résultats de l'analyse du cycle de vie révèlent que les modèles d'activité varient de manière prévisible selon un certain nombre de dimensions liées à la taille, à l'emplacement et au statut à temps plein d'une annonce. Cela démontre que les urbanistes et les fonctionnaires attachés à la création de politiques publiques peuvent, s'ils sont au courant des caractéristiques de base des LCT dans leur juridiction, prédire efficacement les tendances évolutives de leur marché local de LCT et développer des cadres réglementaires ciblés.

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01

Introduction

The recent advent of short-term rental (STR) platforms such as Airbnb have introduced a host of new challenges to communities across Canada; in cities, suburbs, and rural areas alike, residents have been confronted by growing levels of housing pressure and neighborhood disruption inflicted by increased numbers of STRs and tourist visits. Following years of unchecked STR growth, a number of Canadian municipalities have recently proposed or implemented regulatory frameworks with which to manage STRs. Despite hostility from Airbnb towards new regulations and the governing bodies which enforce them, many local Canadian governments and citizens remain steadfast in their mission to protect long-term housing stock.

Since launching in 2008, Airbnb's success has been characterized by its explosive growth (Oskam and Boswijk, 2016). As of 2018, there were more than 5 million Airbnb listings in more than 81,000 cities and 192 countries (Airbnb, 2018a). The platform has facilitated over 400 million total reservations since its conception, with an average of 2 million people sleeping in rentals booked through the site each night (Airbnb, 2018a). Airbnb now offers more rooms and houses than the world's three largest hotel chains combined (Gurran and Phibbs, 2017; Dingam, 2018). The firm has seen parallel growth within Canada, both in terms of the number of listings – reaching 55,000 by 2017 – and total guest check-ins – reaching 5 million by 2018 (Airbnb, 2018b). As of 2016, Airbnb listings represented 18% of Canada's total accommodation supply (Hohol and Godfrey, 2017).

The rapid growth of STRs has led to substantial increases in academic interest in and attention to Airbnb. However, while several studies have examined STR activity in Canada's largest cities (Hohol & Godfrey, 2017; Wachsmuth et al., 2017; Wiedetz, 2017), there has been no comprehensive scholarly research on the state of STRs and Airbnb across Canada. Furthermore, there has been limited research with a micro-scale focus on individual listings rather than the amalgamated activity and effects of citywide Airbnb markets. The lack of empirical knowledge of short-term rental activity in Canada poses challenges for both policymakers and researchers, particularly in small municipalities and rural areas which may lack resources with which to develop and enforce effective regulations.

Accordingly, this study (1) provides the first comprehensive analysis of short-term rental activity in Canada, with a specific focus on Airbnb's impact on Canadian housing, and (2) defines and examines variation in a short-term rental lifecycle. Whereas the first part of the analysis outlines compositional differences in Airbnb markets across Canada and identifies specific types of STRs that contribute to housing loss, the second part examines behavioral differences between various STRs using a lifecycle approach. Both sections work in tandem to paint a complete picture of Airbnb activity; after establishing the breakdown of listing types within a given jurisdiction, planners and

policymakers can leverage the lifecycle analysis to gain a thorough understanding of how these listings' behaviors change as they mature and consequently develop targeted, proactive regulations to manage anticipated negative externalities. Such information is particularly useful for planners and policymakers in small jurisdictions with relatively young short-term rental markets who wish to understand how STR activity is likely to evolve.

This paper is divided into six main sections. Chapter 2 presents a literature review of peer-reviewed papers, policy reports, and media articles that discuss Airbnb and STRs in Canadian and global contexts, and how they relate to and interact with housing. The review identifies two major gaps in current Airbnb research: (1) Airbnb analyses have largely neglected to examine STRs outside of urban areas and (2) a country-wide analysis of Canadian Airbnb activity has yet to be completed. This paper responds to these gaps in the literature by performing a comprehensive analysis of Canadian Airbnb listings and their effects on local housing markets.

Chapter 3 describes the methods and data used to complete this research. A version of this chapter is included in a forthcoming article, "Short-term rentals in Canada: Uneven growth, uneven impacts", in the Canadian Journal of Urban Research, coauthored by Prof. David Wachsmuth and Danielle Kerrigan. A comprehensive dataset of all Canadian Airbnb activity between September 2016 and December 2018 was the focus of the analysis. The Airbnb data was contextualized by localized demographic and housing information. This analysis was performed entirely in R and thus required the creation of a series of standardized scripts that use big spatial data analysis techniques.

Chapter 4 offers a descriptive analysis of the state of Airbnb activity in Canada. As with Chapter 3, large portions of this chapter are included in the forthcoming publication and were also coauthored by Prof. David Wachsmuth and Danielle Kerrigan. The results of this research highlight some concerning trends. Despite Airbnb's insistence that the majority of the site's users are engaging in home-sharing, revenue is highly concentrated amongst hosts and highly concentrated geographically. Frequently rented entire-home listings comprise large and growing portions of active listings across large cities, small cities, and rural areas alike, hinting at housing loss in each. Growth of all types of listings is highest outside of major metropolitan areas, though, suggesting that traditionally-urban problems of congestion, neighborhood disruption, and crime associated with STRs and their guests will increasingly pose challenges to suburban and rural jurisdictions.

Despite these concerning trends, the results of part two of the analysis, presented in Chapter 5, suggest that, if armed with knowledge of the basic characteristics of STRs within their jurisdiction, planners and policymakers can effectively predict the evolutionary patterns of their local STR market. For example, markets that are primarily composed of part-time listings typically see a surge of listing creations in the late spring and early summer followed by a surge of listing takedowns in the late summer and early fall. This pattern is particularly evident in popular tourist destinations,

such as Kelowna, St. Catharine's – Niagara, Victoria and the Maritimes, and is likely fueled by large fluctuations in seasonal demand for tourist accommodations. Conversely, markets dominated by very frequently rented entire-home (VFREH) listings demonstrate stable rates of listing creation and occupancy year-round, and long average life lengths. In this example, there is a clear divergence of problems that must be addressed by STR regulations; whereas markets dominated by part-time listings must manage the neighborhood disruption that accompanies temporally-concentrated STR activity, markets with high numbers of VFREH listings must overcome the challenges of housing loss posed by constant, high-level STR activity.

Finally, Chapter 6 offers a number concluding remarks about the need for short-term rental regulations. Despite increases in the number of jurisdictions moving to regulate short-term rentals, their effectiveness has yet to be proven. While there are disagreements regarding the specifics of STR regulations (which policies are the most effective, at what level should they be enforced, etc.), there is growing agreement that strong regulatory frameworks are required to protect further loss of Canadian housing stock.

02

Literature Review

The introduction of peer-to-peer sharing platforms has created an abundance of new regulatory challenges for cities. Home sharing platforms, such as Airbnb, are no exception; questions of equity and rights to the city are being raised with increasing regularity as locals argue that short-term rental (STR) sites cater to tourists' desires at the expense of long-term residents' housing needs (Wachsmuth et al., 2017). In response to these claims, academic interest in and attention to Airbnb has grown substantially in recent years. The majority of the literature on Airbnb thus far remains focused on its relationship with tourism (Cheng, 2016; Oskam and Boswijk, 2016), the hotel industry (Zervas et al., 2017, Guttentag, 2015) and housing affordability (Wachsmuth et al., 2017; Wachsmuth et al., 2018; Gurran and Phibbs, 2017; Schäfer and Braun, 2016). To date, there has been no comprehensive scholarly research on the state of short-term rentals and Airbnb in Canada. Furthermore, there has been limited research with a micro-scale focus on individual listings rather than the amalgamated effects of citywide Airbnb markets. Given the focus of this research project, the following literature review puts particular emphasis on peer-reviewed papers, policy reports, and media articles that discuss STRs in a Canadian context and how they relate to and interact with housing.

In recent years, tourism literature has framed Airbnb as a "disruptive product" that, despite lacking commonly-desired amenities such as brand reputation, security, and staff friendliness, has captured mainstream consumers by offering convenient accommodation opportunities at reduced costs (Guttentag, 2015; Guttentag, 2017). Following its successful appropriation of hotel clients, Airbnb became subject to harsh critiques from the traditional accommodation sector. While hoteliers frequently claim that Airbnb has taken a piece of the revenue pie away from hotels and motels, others contends that they have simply made the overall pie larger by enabling trips for people who otherwise would not have had the desire or the means to travel (Griswold, 2015). Several academic researchers have disputed Airbnb's claims, noting that increasing numbers of Airbnb listings have placed significant pressure on cheaper, tourist-oriented hotels (Zervas et al., 2017; Gurran and Phibbs, 2017): in one study focusing on Austin, Texas, a 10% increase in Airbnb listings was found to decrease monthly hotel revenues by 0.39% (Zervas et al., 2017). In a Canadian context, peer-reviewed literature with a tourism perspective has examined the overarching relations between the sharing economy and Canadian tourism (Sovani and Jayawardena, 2017), as well as revenue-optimizing strategies for pricing Airbnb listings (Gibbs et al., 2017).

Although affected in different ways and motivated by different underlying concerns, affordable housing advocates and renters have joined the traditional accommodation sector in recognizing Airbnb as a common enemy. Over the last decade, thousands of cities and millions of residents worldwide have been impacted by the effects of record-high tourism levels on their local economies, housing markets, and quality of life. Amongst the wide-ranging negative externalities of increased

tourism, effects on housing are particularly severe as scarce resources (such as housing) have been noted to be particularly vulnerable to appropriation by tourists (Blanco-Romero et al., 2018). This pressure on housing has been further exacerbated by "new urban tourism" and "touristification of the everyday" practices, which, as a consequence of tourists' distaste for pre-packaged vacations and desire to ingrain themselves in everyday life, have contributed to the permeation of residential spaces by tourist-oriented amenities (Kaczmarek, 2017; Füller and Michel, 2014).

Recognizing the pressures created by new urban tourism, the housing-focused strand of Airbnb research has examined the relationship between STRs and housing accessibility, neighborhood disruption, and regulatory and legislative options. It is widely acknowledged that frequently rented entire-home listings place the largest strain on local housing stock, as these listings represent units that are unlikely to be rented to permanent tenants (Wachsmuth et al., 2017; Wachsmuth et al., 2018). Several policy reports have identified the presence of frequently rented entire-home listings in Montréal, Toronto, and Vancouver, estimating that over 13,000 units across the three cities have been removed from the long-term rental market (Wachsmuth et al., 2017; Desmarais, 2016; Wieditz, 2017). In some Canadian neighborhoods, more than 2% of the housing stock has been converted to full-time short-term rentals (Wachsmuth et al., 2017).

The large and growing body of scholarly research examining the effects of these injurious STRs on housing affordability and gentrification puts forth a convincing argument that new economic gains afforded to landlords by STRs have led to a proliferation of long-term rental to short-term rental conversions, displacing significant numbers of residents and decreasing the overall supply of housing (Gurran, 2018; Wachsmuth et al., 2017; BJH Advisors LLC, 2016; Sawatzky, 2016; Samaan, 2015). Such practices have led to increases in housing prices (Lee, 2016; Wachsmuth et al., 2017; Wachsmuth et al., 2018; Barron et al., 2017; Elíasson and Ragnarsson, 2018; Horn and Merante, 2017), gentrification (Gant, 2016; Wachsmuth and Weisler, 2018; Desmarais, 2016), and local neighbor exclusion (Milano, 2017). Further analyses have revealed that housing loss attributed to Airbnb is six times more likely to affect Black residents than White residents, thanks to distinct patterns of racial gentrification (Cox, 2017). Zealous attempts on the part of Airbnb to discredit these accounts of racial disparities point to the firm's unwillingness to confront and remedy unsettling realities, opting instead to perpetuate discrimination and oppression through intentional ignorance (Cox, 2018).

In alignment with Belsky's (1992) understanding of equilibrium vacancy rates, which recognizes that the vacancy rate at which supply and demand for rental housing are in balance varies by city, the negative effects of frequently rented entire-home STRs are especially profound on housing markets already characterized by low vacancy rates, such as New York (New York State Attorney General, 2014), San Francisco (Brousseau et al., 2015), and Berlin (Schäfer and Braun, 2016). Renters in these high-demand, low-supply environments face particularly high levels of insecurity; in several contexts, researchers have highlighted how short-term rentals concurrently bolster

flexibility and opportunity for homeowners while increasing uncertainty and housing costs for renters. A report commissioned by the City of Auckland, New Zealand perceptively characterized Airbnb as a simultaneous catalyst of and manifestation of the financialization of housing, noting that housing has increasingly been viewed as a commodity rather than as shelter (Tuatagaloa and Osborne, 2018). Similarly, researchers examining Airbnb in Barcelona concluded that the platform offers economic relief to residents with a secure foothold in the property market but fails to provide opportunities to renters and to residents of the city's poorest neighborhoods (Sans and Domínguez, 2016). In Berlin, short-term rentals have been deemed a misuse of the city's housing stock due to the extra stress they place on a housing market already burdened by low numbers of rental units and high rates of internal migration (Schäer and Braun, 2016). STRs may disadvantage Canadian renters as well. As noted by the country's preeminent housing scholar, David Hulchanski (2006), federal housing policies tend to reinforce a deeply-embedded culture which celebrates homeowners and stigmatizes renters by offering the former group substantial subsidies while treating the latter group as a financial liability. Without due thought and consideration, STR regulations may perpetuate these problematic attitudes by failing to prioritize renters' housing needs over increased financial opportunities for homeowners (Sawatzky, 2016).

In addition to placing intense pressure on housing stocks, Airbnb listings have also been noted to cause neighborhood disruption in the form of crime, noise and traffic, leading to increased conflicts between locals and visitors (Jordan and Moore, 2018; Füller and Michel, 2014; Lambea Llop, 2017; Leland, 2012). In several cases, these negative externalities have led to demonstrations against "short-term strangers" by disgruntled residents (Walker, 2016). A number of anti-tourist protests erupted throughout Barcelona in August 2014, during which demonstrators vocalized their frustrations with "binge tourism" and the headaches inflicted by the actions of drunken tourists (O'Sullivan, 2014). In Berlin, the discordance between tourists' desires and residents' needs was emphasized by a graphic campaign in which the Airbnb logo was altered to appear as though it were milking the city of housing units (Pereira, 2016).

Reports of these negative externalities have, in some situations, been rationalized by the economic benefits Airbnb offers the host city. Yglesias (2012) posits that increasing the supply of cheap accommodation opportunities will likely have positive impacts on the broader tourism economy, while Porges (2013) contends that the spatial dispersal of Airbnb listings is likely to provide economic benefits to neighborhoods that do not typically receive tourist spending. Others argue that Airbnb listings are able to respond to short-term peaks in lodging demand in a way that hotels cannot, particularly in locations where there is low demand for year-round tourist accommodations (Guttentag, 2015). Airbnb supports these claims, arguing that home sharing facilitates increased spending and new economic opportunities to the host neighborhoods (Airbnb, 2016). However, there is little quantitative proof of economic benefits outside of areas with high levels of tourist activity (Oskam and Boswijk, 2016).

In a departure from the typical examination of Airbnb's externalities, Ingrid Gould Ellen (2015) notes that the overwhelming success of Airbnb points to the existence of excess capacity within the housing stock and to the willingness of people to share their homes with others when compensated. She suggests that researchers and government actors seriously examine the extent to which Airbnb and similar platforms can be used to match this excess housing stock with low-income families as a potential affordable housing solution.

While the costs of STRs are often inequitably shouldered by the residents of low-income, gentrifying neighborhoods, the benefits are highly concentrated geographically and amongst a small number of high-earning hosts (Wachsmuth et al., 2017; Wieditz, 2017; Tuatagaloa and Osborne, 2018). Despite regular insistence from Airbnb that the majority of hosts on the platform participate in home sharing in order to receive supplemental income, large and growing amounts of Airbnb revenue are earned by commercialized operators who manage multiple listings. Benefits are further limited to those who (1) can legally rent out their homes and (2) live in areas deemed desirable by tourists (Schor and Attwood-Charles, 2017).

Policy reports examining Canadian Airbnb markets demonstrate similar and growing patterns of concentrated benefits (Desmarais, 2016; Wieditz, 2017; Wachsmuth et al., 2017; Hohol & Godfrey, 2017; Jamasi, 2017). In a report commissioned by the Hotel Association of Canada examining the 11 largest Airbnb markets in Canada, Hohol & Godfrey (2017) found that multi-unit entire-home operators are growing faster than any other category of host, both in terms of number of units and revenue. Listings rented for more than 90 days per year earned 70% of total Airbnb revenue, while units rented for more than 180 days per year earned 20% of total revenue. Similarly, Wachsmuth et al. (2017) concluded that there are over 6,000 frequently rented entire-home multilistings in Montréal, Toronto and Vancouver which, while constituting only 5% of total listings, earn 34% of all revenue.

As noted by Guttentag (2015), technology-based disruptive business models such as Airbnb often develop faster than the regulatory frameworks that manage them, prompting frequent questions and concerns about their legality. As the regulation of short-term rentals is increasingly viewed as falling under the jurisdiction of local governments, growing numbers of municipalities are developing new regulatory frameworks to manage them (Jamasi, 2017; Wachsmuth et al, 2017; Desmarais, 2016). Consequently, scholars have devoted significant attention to discerning effective regulatory frameworks and concretely identifying their impacts (Gurran & Phibbs, 2017; Crommelin et al., 2018; Leshinsky and Schatz, 2018; Guttentag, 2015; Schäfer and Braun, 2016; Wegmann and Jiao, 2017). While the justification for regulations has been called into question by at least one researcher (Gottlieb, 2013), the majority of scholars espouse the need to protect urban housing stocks. Common regulations with this goal frequently require licensing or registration of STRs, restrict the number of days STRs can be rented, require liability insurance, and limit hosts to renting STRs in their primary residence only. Regulatory frameworks that are thought to be

particularly effective include limiting hosts to one listing, banning full-time, entire-home listings, and shifting the burden of enforcement to STR platforms (Wachsmuth et al., 2017; Gurran and Phibbs, 2017). However, the efficacy of each of these regulatory methods depends upon the degree to which they are successfully enforced (Jamasi, 2017; Guttentag, 2015).

While affordable housing advocates have pushed for regulations that protect local housing stock, the traditional accommodation sector has advocated for regulations that subject STRs to the same stringent guidelines by which hotels, motels, and bed and breakfasts must abide. Driven largely by a desire to protect themselves from the onslaught of competition introduced by Airbnb's disruptive business model, hotels frequently contend that Airbnb hosts unfairly benefit from hotel-funded destination-related marketing without having to adhere to minimum health or safety standards (Guttentag, 2015). Based on 2016 rental rates, the Canadian Airbnb market would contribute $85 million dollars in taxes were it subject to the same fees as other accommodation venues (Hohol and Godfrey, 2017).

One common critique of the aforementioned regulatory schemes is that they fail to mitigate noise, traffic, and parking problems for surrounding residents. In an attempt to pacify disgruntled neighbors, Airbnb created an online resource for local residents to report inappropriate visitor behavior in their neighborhoods. Relying on market or voluntary regulation, however, fails to address all of the concerns typically held by municipal planners, such as minimum fire and safety requirements, occupancy limits, and proper waste disposal management (Gurran and Phibbs, 2017; Palombo, 2015).

In some cases, local forms of self-governance have proven more effective than municipal governments at regulating Airbnb activity. Many condo boards prohibit short-term rentals within their buildings and are quick to act upon reports of non-compliance. Accounts of Airbnb hosts being evicted and sued by their condo boards for operating illegal STRs out of condominiums suggest that, in some cases, a crackdown by landlords and condo boards may be far more threatening than municipal legislation (Guttentag, 2015).

In Canada, the province of Québec was the first to introduce targeted legislation aimed at regulating STRs and collecting tax revenue (Wachsmuth et al., 2017). More recently, both Toronto and Vancouver have acknowledged the potentially pernicious effects of STRs, adopting more stringent regulations with which to control them. Regulations are gaining popularity in smaller jurisdictions as well, with almost 50% of people across the country claiming that they would like to see their local community regulate STRs that are not operated out of a hosts' primary residence (Angus Reid, 2018). Even with regulations, however, challenges remain. Enforcement proves difficult for a number of cities, with recent reports of rule breakers in Vancouver questioning the ability of new regulations to affect change (Neustaeter, 2018). In some cases, municipalities seem to be working against their own goals. A new partnership between Airbnb and Tourism Vancouver aimed at

promoting the city to tourists appears to undermine the City's stated commitment to protecting its rental stock (William-Ross, 2018).

This literature review highlights two major deficits in the current state of Airbnb research. First, Airbnb analyses have failed to examine the effects of STRs outside of large metropolitan areas, leaving many smaller cities, suburban regions, and rural areas without access to data on short-term rental activity in non-urban contexts. This lack of information poses a particular challenge for smaller jurisdictions that likely have fewer resources with which to tackle the problem of regulating STRs but have felt significant pressure following the increase in popularity of home-sharing sites (Brown, 2016; Conners, 2018). Second, scholarly research has not yet performed a country-wide analysis of Canadian Airbnb activity. Such an analysis is necessary to understand STRs' interactions with housing and to devise appropriate regulatory frameworks. This paper responds to these gaps in the literature by using big spatial data analysis methods to perform a comprehensive analysis of Canadian Airbnb listings and their effects on local housing markets.

03

Methods and Data

The analysis in this study was conducted using a comprehensive dataset of all Airbnb activity in Canada from September 2016 to December 2018. The data was compiled by the consulting firm Airdna, on the basis of daily "scrapes" of Airbnb's public website. It provides canonical information about individual listings (e.g. the listing title; whether it is an entire home, private room or shared room; the number of bedrooms; and the cancellation policy), and daily estimates for listing activity (reserved, available or blocked) and prices[1]. The dataset includes 279,763 listings, 212,883 of which were active on Airbnb's website in 2018. In total, 143 million data points concerning daily Airbnb transactions were aggregated and analyzed using a set of custom functions written in the R programming language, and relying on the open-source packages cancensus, circlize, cowplot, dplyr, forcats, foreign, ggforce, ggplot2, gridExtra, lubridate, polyCub, purrr, readr, scales, sf, spatstat, stingr, tibble, tidyr, tmap, tmaptools, and zoo (Baddeley et al., 2015; Baptiste, 2017; Grolemund and Wickham, 2011; Gu, 2014; Henry and Wickham, 2019; Meyer, 2019; Müller and Wickham, 2019; Pebesma, 2018; Pedersen, 2019; R Core Team, 2018a, 2018b; Tennekes, 2018a, 2018b; von Bergmann et al., 2018; Wickham, 2016, 2018, 2019a, 2019b; Wickham and Henry, 2019; Wickham et al., 2018, 2019; Wilke, 2019; Zeileis and Grothendieck, 2005).

An inherent limitation of spatial analysis of Airbnb data is that the exact location of properties cannot be ascertained because the publicly displayed latitude and longitude coordinates of a listing on Airbnb's website are randomly shifted up to 200 meters from their true location. To compensate for this obfuscation, listings are aggregated at the dissemination-area scale and assigned a location using a Bayesian spatial inference technique which relies on the distribution of housing units across a city to weight the probability that a given listing came from a given dissemination area (described in Wachsmuth et al., 2019). (Dissemination areas are small, relatively uniform areas with a target population of 400-700, and they are the smallest scale at which all Canadian census data is disseminated.) Listings are then further aggregated at the census metropolitan area (CMA) or census agglomeration (CA) scales for cross-country comparisons. In order to avoid overestimating the impacts of STRs on housing and neighborhoods, non-housing listings such as igloos, vans, boats, parking spaces, hotels, and bed and breakfasts are excluded. Approximately 9,500 such listings which generated 3% of Airbnb host revenue in Canada in 2018 were removed from this analysis.

In addition to the Airbnb listings data from Airdna, the other data sources relied on are the Canadian Census and the Canada Mortgage and Housing Corporation (CMHC) Comprehensive Rental Market Survey. For the Census, 2016 data has been used. The CMHC data is from the October 2016 Comprehensive Rental Market Survey, supplemented with data from earlier years where relevant.

1 For a more thorough discussion of this data source, along with its strengths and limitations, see Wachsmuth and Weisler (2018).

04

Short-term rentals in Canada: An overview

4.1 Introduction

This chapter directly responds to the gaps in the Airbnb literature highlighted above by examining Airbnb activity outside of large metropolitan regions and by providing the first country-wide analysis of Canadian Airbnb markets. In order to understand how short-term rental markets vary across Canada, Airbnb activity is examined with consideration to type (entire home, private room, or shared room), occupancy-rate status (frequently rented or part-time), commercial status (commercial or non-commercial), and location. The location of Airbnb activity is analyzed at three spatial scales: (1) across regions, (2) amongst CMAs, and (3) within CMAs. At the regional scale, comparisons highlight differences between listings in large cities (CMAs), small cities (CAs) and rural areas. Comparisons amongst CMAs, meanwhile, highlight differences in activity between Airbnb markets in Canada's 35 largest cities. Finally, spatial patterns within individual cities are emphasized at the third and smallest scale.

Throughout the chapter, we pay close attention to the effects of Airbnb activity on housing loss by identifying particular types of short-term rentals – frequently rented entire-home listings – that are unlikely to serve as long-term housing due to the frequency with which they are rented on Airbnb. Additional information regarding commercial operators – hosts who manage two or more entire-home listings or three or more private room listings – further contextualizes full-time short-term rental activity by highlighting additional cases in which long-term housing stock is being repurposed and misused. Areas which are facing severe housing pressure as a result of this misuse are identified by comparing the percent of housing units frequently rented on Airbnb with city-wide vacancy rates. Finally, we also examine growth patterns of active listings and of revenue in order to predict which areas across Canada will face increasing housing pressure and other disruptions as a result of growing short-term rental markets.

We find that Airbnb activity is highly concentrated geographically—nearly half of all active listings are located in the Toronto, Montréal and Vancouver metropolitan areas—and highly concentrated among hosts, the top 10% of whom earn a majority of all revenue. Contrary to the rhetoric of "home sharing", almost 50% of all Airbnb revenue last year was generated by commercial operators who manage multiple listings. Moreover, at least 31,000 entire homes were rented frequently enough last year that they are unlikely to house a permanent resident. This housing pressure disproportionately affects cities in British Columbia. While current Airbnb activity is concentrated in major cities, active listings, total revenue, hosts with multiple listings, and frequently rented entire-home listings are all growing at substantially higher rates in small towns and rural areas.

4.2 Where and when is Airbnb activity happening in Canada?

Airbnb activity in Canada spans the entire country. Figure 1 shows the distribution of active Airbnb listings. The distribution of Airbnb activity roughly mirrors Canada's distribution of population, as shown by the high concentration of Airbnb activity in the Windsor to Québec corridor and other major urban areas, and the comparative lack of activity in remote northern portions of the country. Nearly half (46%) of all active Airbnb listings are located in Montréal, Toronto or Vancouver, despite the fact that these CMAs only house 36% of Canada's population (Table 1). In total, 71% of Airbnb listings are located in one of Canada's 35 CMAs (which house 69% of the country's

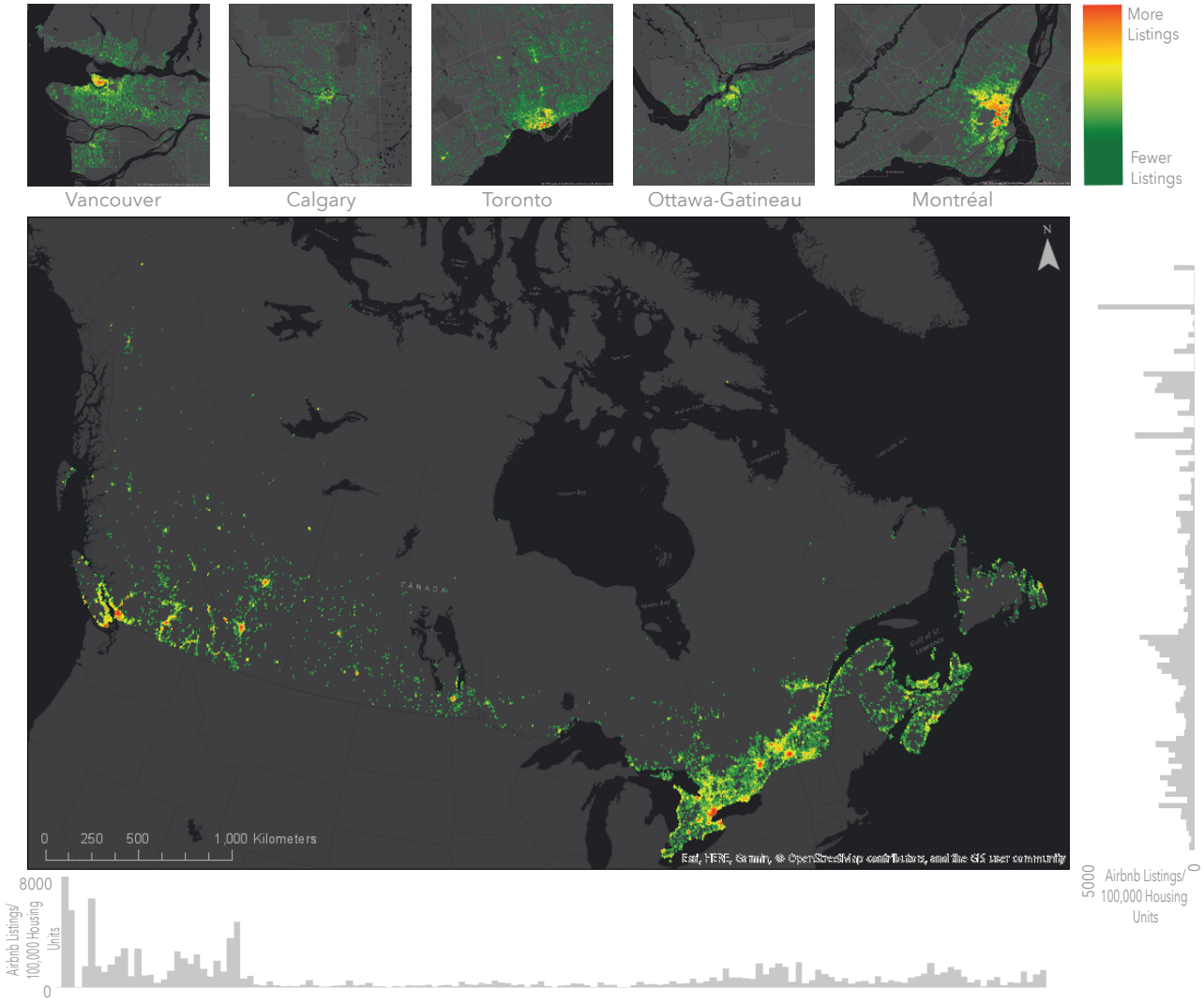

Figure1: Airbnb listings across Canada and in the five largest CMAs, with histograms of the distribution of listings by longitude and latitude

population), 8% are located in one of its 117 CAs (which house 11% of the country's population) and the remaining 21% are located in rural areas (which house 19% of the population). Based on

Table 1: Airbnb listings across Canada

Geography	Average # of active daily listings in 2018 (% of national total)	% year-over-year growth in average active daily listings	2018 host revenue (% of national total)	% year-over-year growth in host revenue
CMAs	91,140 (71%)	19%	$1,079.2 million (60%)	31%
Montréal, Toronto, Vancouver	*58,410 (46%)*	*14%*	*$710.4 million (39%)*	*27%*
CAs	9,740 (8%)	42%	$156.5 million (9%)	53%
Rural	27,140 (21%)	44%	$570.5 million (32%)	58%
All of Canada	*128,020 (100%)*	*25%*	*$1,806.2 million (100%)*	*40%*

Canada's distribution of population alone, CMAs have a higher percentage of the country's Airbnb listings than expected, while CAs have less than expected. However, the annual growth rate of active listings in CAs (42%) and rural areas (44%) is significantly higher than in CMAs (19%), indicating that today's high concentration of Airbnb activity within CMAs is giving way to a future of more evenly dispersed activity (Figure 2).

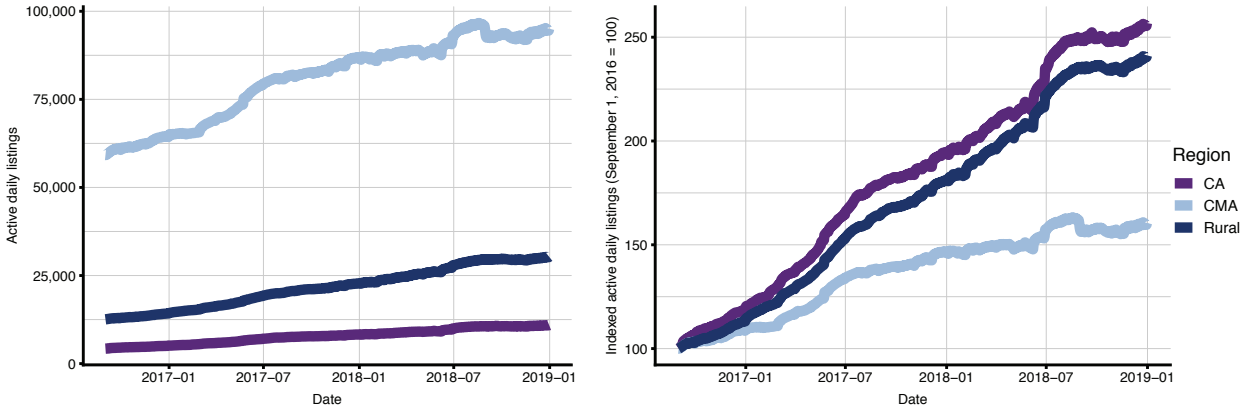

Figure 2: Raw and indexed growth of daily active Airbnb listings by region

The histograms bordering the density map in Figure 1 offer a view of Airbnb activity in Canada normalized by population, showing the number of active listings per unit of housing at different latitudes and longitudes. The large spikes in the number of listings per unit in the western portion of the country indicate that, while activity may be concentrated in southern Ontario and Québec in absolute terms, the West Coast sees higher levels of activity relative to population. Numbers of listings per unit also peak around Calgary and Edmonton, and further north in Whitehorse.

In general, listings in rural regions earn more revenue than listings in CMAs (Figure 3). Despite accounting for 71% of the active listings in Canada, listings in CMAs only generate 60% of the country's revenue. Conversely, rural listings earn proportionately more than their share of income, producing 32% of revenue in the last year despite housing only 21% of active listings. This disparity between the distribution of activity and the distribution of revenue is largely explained by the higher proportion of entire-home listings in rural areas. Entire-home listings have higher average nightly prices ($126) than either private room listings ($49) or shared room listings ($32), and entire homes make up a higher percentage of rural listings (83%) than non-rural listings (63%), leading to higher revenue in the former than the latter[2]. The revenue generated by listings in CAs is relatively proportionate to their share of active listings; they are responsible for 9% of total revenue and 8% of active listings. As with active listings, the growth rate of revenue generated by listings in CAs (53%) and by listings in rural areas (58%) is higher than it is for revenue generated by listings in CMAs (31%), once again demonstrating that these areas are attracting increased amounts of Airbnb activity and shifting the previous pattern of concentration within CMAs.

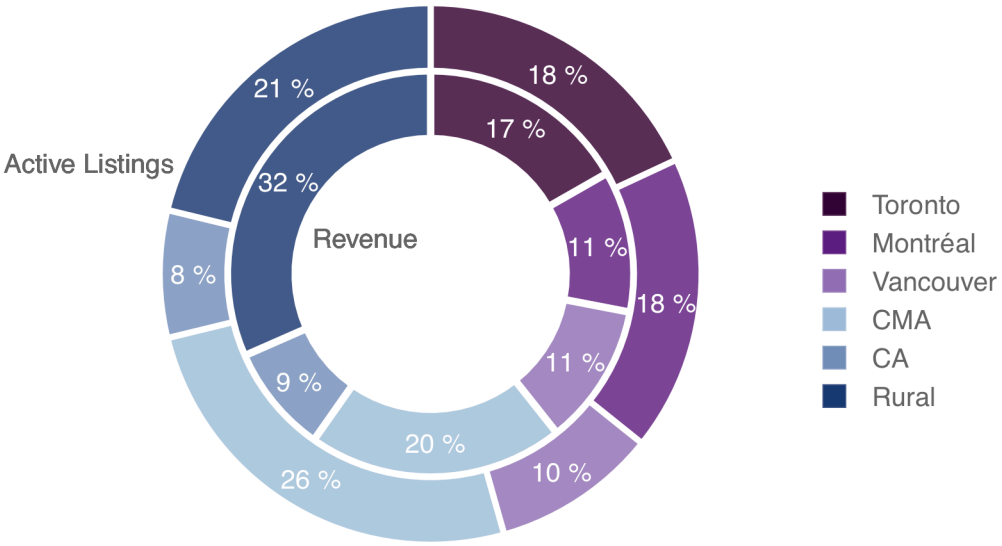

Figure 3: Share of active listings and of revenue (last twelve months) among different regions

The spatial concentration of Airbnb activity within CMAs varies significantly between cities, as shown in Figure 4. In general, CMAs with more absolute revenue (as represented by their share of total national Airbnb revenue) also exhibit higher levels of revenue concentration (as represented by the maximum proportion of CMA revenue generated in census tracts housing 10% of the CMA population), suggesting that the costs and rewards of the platform's use may be highly localized. Montréal, which generates roughly 11% of all Canadian Airbnb revenue, produces over 80% of its revenue in census tracts that house 10% of the CMA's population. On the other end of the spectrum is Lethbridge; the CMA produces less than 0.1% of Canada's revenue, and generates only 37%

2 All prices throughout the paper are in Canadian dollars (CAD).

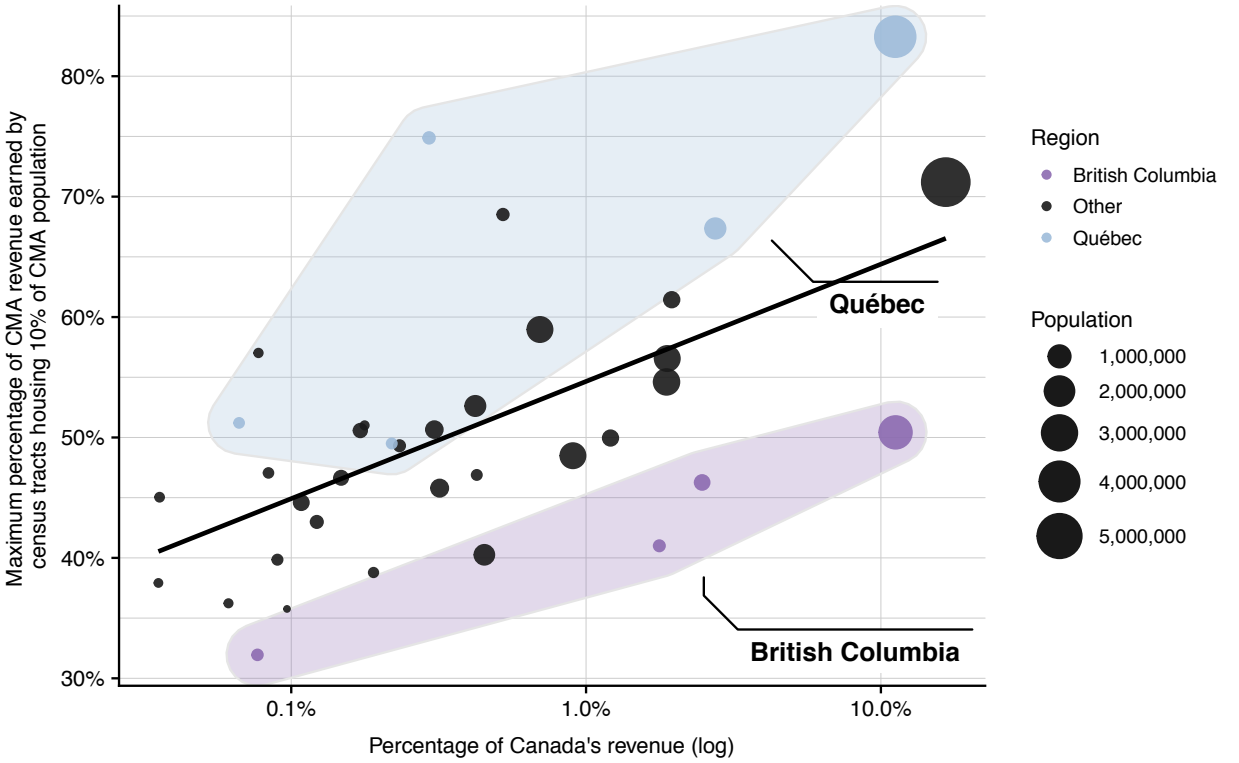

Figure 4: Concentration of Airbnb revenue per CMA (as measured by the maximum percentage of revenue earned by census tracts housing 10% of CMA population) by the percentage of total Canadian Airbnb revenue the CMA earned

of its own revenue in census tracts that house 10% of its population. While the overall correlation between total revenue and revenue concentration is quite strong ($\rho = 0.52$), cities in Québec and British Columbia stand out as partial exceptions to this pattern. In Québec, revenue concentration is substantially higher than expected given the proportion of revenue its cities earn, while in British Columbia, concentration is lower than expected.

Airbnb activity also exhibits temporal concentration; on average, after adjusting for secular growth patterns, listings earn the largest share of their total yearly revenue in July and August (Figure 5). The intensity of this pattern varies by region. In Atlantic Canada, Airbnb revenue is highly

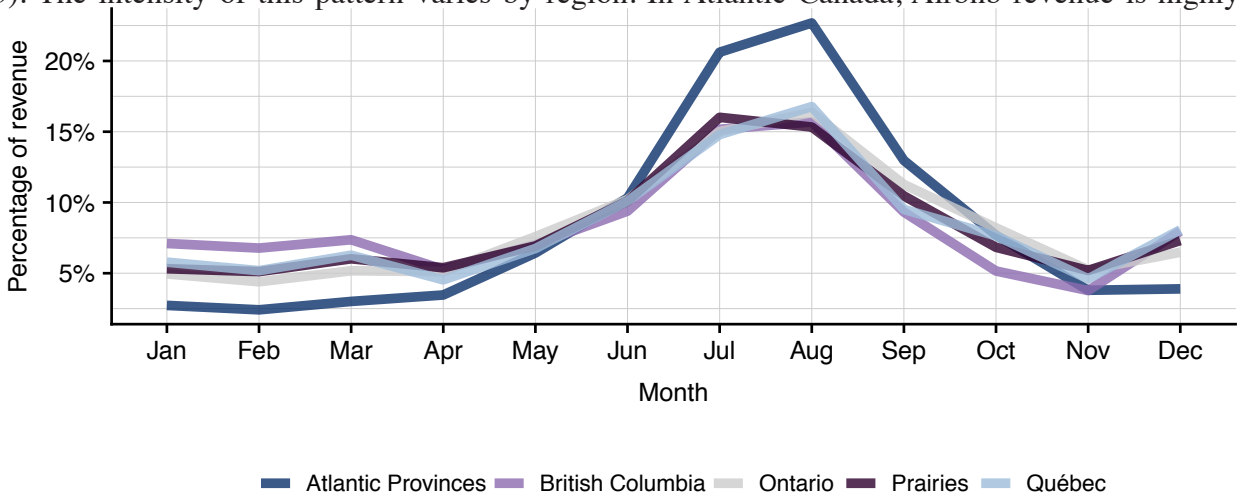

Figure 5: Percentage of annual Airbnb revenue earned by month (growth adjusted)

seasonal: listings earn almost 50% of their total yearly revenue in July and August alone. The strong concentration of Airbnb revenue in the summer period suggests a larger dependence on seasonal leisure tourists in Atlantic Canada, as opposed to business travellers who require lodging year-round.

4.3 Who is making money on Airbnb and how?

Airbnb hosts are earning unprecedented revenue in Canada, but a smaller and smaller share of operators are earning a larger and larger piece of the pie. In 2018, hosts across the country earned $1.8 billion, which was a 40% increase in revenue over the previous year, despite the fact that the number of active listings only increased by 25%. This revenue was not evenly distributed, however. Among the 103,290 hosts that earned revenue in 2018, the median host earned $3,180, while the average host earned $13,290.

Revenue is highly concentrated amongst a small number of hosts at all scales of analysis. In general, CMAs, CAs, and rural areas show similar levels of concentration; for each region, the top 1% of hosts earn 20% of all revenue and the top 10% of hosts earn more than half of all revenue (Figure 6). However, discrepancies in host revenue concentration exist between CMAs. Specifically, the cities which exhibit high levels of geographically concentrated revenue—notably Montréal, Québec, and Toronto—also exhibit high levels of revenue concentration amongst hosts.

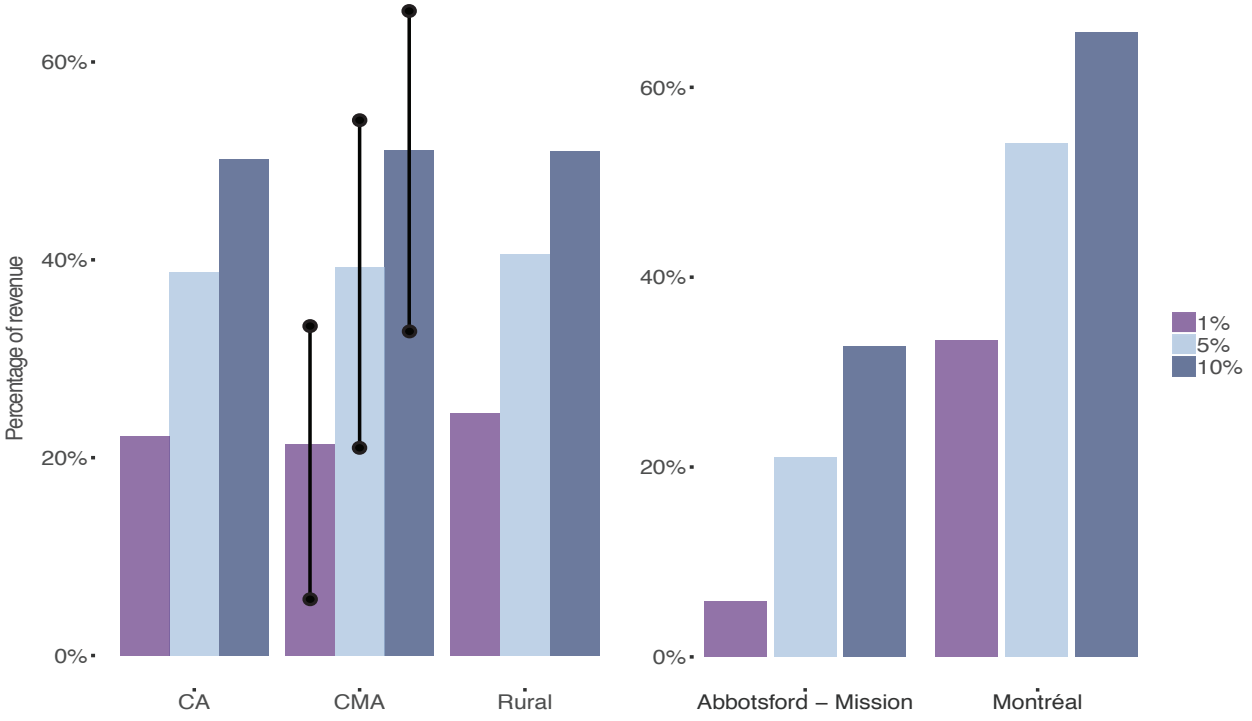

Figure 6: Percentage of revenue earned by the top 1%, 5%, and 10% of hosts in CMAs, CAs, and rural areas over the last twelve months (hosts with no revenue in the last twelve months are excluded). The black bars on the left panel illustrate the range of revenue concentration at each host percentile, and are expanded upon in the right panel.

The parallels between different metrics of revenue concentration serve to highlight the uneven patterns of Airbnb inequality across Canada. Of the CMAs, Montréal shows the highest revenue concentration amongst hosts—the top 1% of hosts earn 30% of all revenue—whereas Abbotsford - Mission has the lowest amount of concentration —the top 1% of hosts earn just over 5% of all revenue.

An important policy question concerning short-term rentals is the extent to which STR operators are part-time home sharers or dedicated commercial operators. Indeed, Airbnb frequently asserts that most of its hosts are families engaging in part-time home sharing to supplement their regular income (e.g. Bannerjee, 2017). The preceding host revenue analysis shows this claim to be at minimum misleading, since most revenue is earned by the top 10% of hosts while the bottom 80% of hosts only earn a small fraction of total platform revenue in nearly every jurisdiction in the country. However, another way to approach the question of host revenue concentration is by identifying STR commercial operators—those whose listings are dedicated STRs as opposed to being their primary residences. While there is no practical way to exhaustively identify commercial operators (a survey of hosts would be necessary), a conservative minimal definition is hosts with "multilistings"—two or more entire-home listings or three or more private-room listings. This definition will likely produce many false negatives—e.g. a host who owns a condo as an investment property and rents it on Airbnb as an entire-home listing, but who does not have any other listings on the platform—but will produce very few false positives, since any host with multiple entire-home listings cannot by definition have each of them be their principle residence. By this minimal definition, commercial operators are earning large and growing amounts of all Airbnb revenue in Canada. CMAs and rural areas are slightly more commercialized than CAs: 48% of all revenue is earned by commercial operators in the former, while in the latter they earn 45% of all revenue. Furthermore, across all regions the share of both listings and host revenue accruing to commercial operators increased between 2017 and 2018, indicating that the STR market in Canada is becoming increasingly commercialized over time.

Across CMAs, Montréal, Québec, and St. Catharine's - Niagara show the most commercialization, with 59%, 54%, and 51% of their revenue derived from multilistings respectively. In general, larger CMAs with more mature Airbnb markets have higher levels of commercialization: Toronto (49%), Moncton (49%), Halifax (46%), Ottawa – Gatineau (46%) and Edmonton (46%) are also among the CMAs with the largest proportion of their revenue derived from multilistings, while Abbotsford-Mission (13%), Guelph (21%), and Lethbridge (23%) are at the bottom of the list. Within CMAs, there is no strong spatial pattern of revenue generated by commercial operators; rather than being concentrated in a particular portion of the cities, multilisting hosts generate revenue with similar spatial distributions to other hosts. Figure 7 shows connections between multilistings owned by the same host, illustrating that properties managed by commercial operators are significantly more likely to be clustered within one CMA than spread across multiple CMAs (top panel). However,

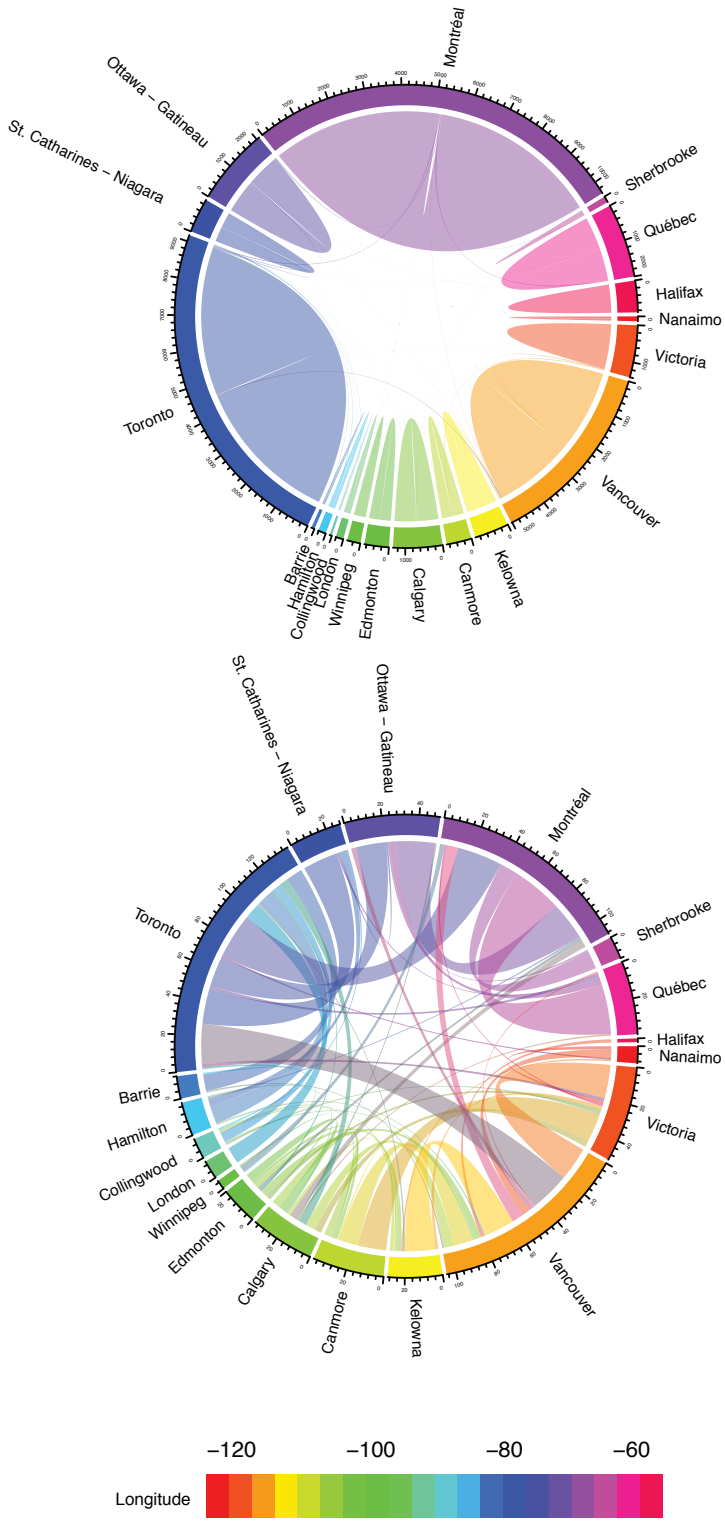

Figure 7: Distribution of multilistings within and between cities. The top panel shows the geographical location of multilistings organized by host (each line connects two listings operated by the same host), and demonstrates that most multilisting hosts operate within a single city. The bottom panel shows the same relationships, but only for hosts with listings in multiple cities, and demonstrates strong regional interconnections as well as interconnections between the largest CMAs.

an analysis of cross-CMA multilisting connections (bottom panel) demonstrates a number of distinct patterns. In general, multilistings are more likely to be located in cities that are in close proximity to one another, as exemplified by the strength of the connections between Montréal and Québec, Victoria and Vancouver, and Ottawa and Montréal. Strong cross-country multilisting connections are likely to occur between larger CMAs, including Montréal, Toronto, Vancouver.

In almost all CMAs, the percentage of total revenue generated by commercial operators increased in the last year, with particularly high growth rates in Montréal and several smaller CMAs. Across Canada, there are fifteen hosts that managed over 100 active listings each in the past year, four of whom managed over 250 active listings each. The vast majority of these hosts also earned over $1 million in the last year. In total, 57 hosts earned more than $1 million in 2018.

On average, entire-home listings make up a higher proportion of active listings (83%) and revenue (95%) in rural areas than in CMAs (63% of listings and 86% of revenue) or CAs (70% of listings and 89% of revenue). Figure 8 shows the relationship between city size, revenue, and percentage of revenue generated by entire-home listings. The largest, highest-earning cities (including CMAs and CAs) consistently earn very large proportions of their revenue from entire-home listings, suggesting that home sharing is not the predominant form of revenue generation in these areas. Conversely, low-

earning cities show a much larger range of revenue generated by entire home listings. Within urban areas, the spatial pattern of revenue generated from entire-home listings is relatively weak, aside from the fact that central cities tend to earn slightly higher percentages of their revenue from entire-home listings than their surrounding regions.

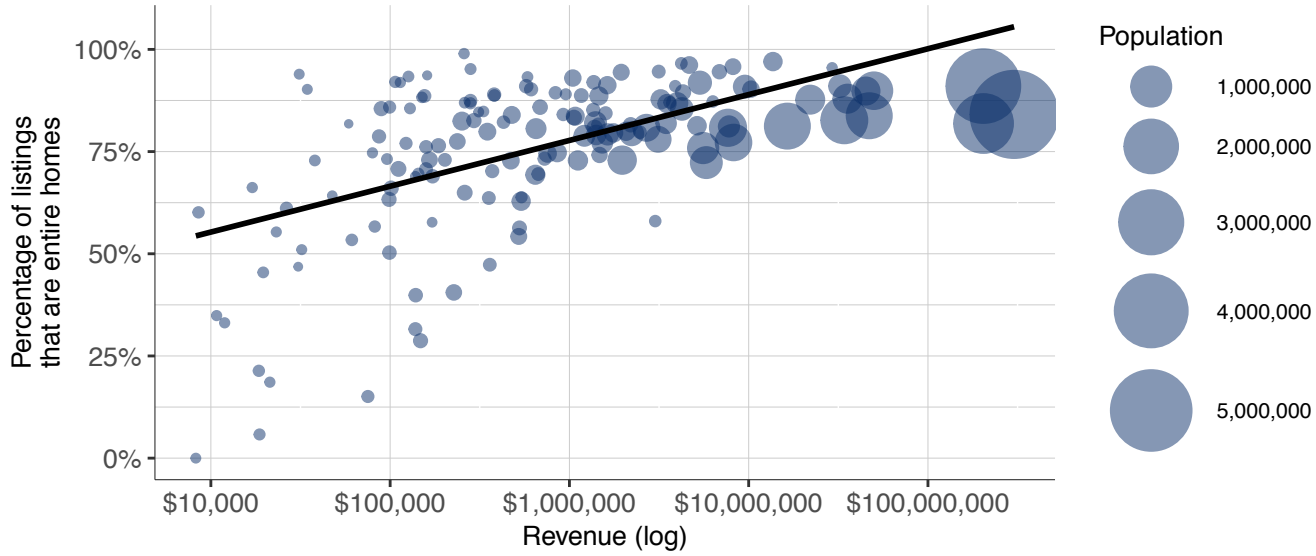

Figure 8: Percentage of revenue derived from entire-home listings by revenue earned in the last year for each CMA and CA, weighted by population

4.4 Are short-term rentals threatening long-term housing in Canada?

Arguably the most important policy question associated with the rise of short-term rentals has been the extent to which they are increasing housing unaffordability and unavailability. The two plausible channels through which this could occur are 1) that long-term housing could be converted to full-time STRs and thus directly reduce the stock of housing available for residents; and 2) that STRs could increase the prevailing economic value of housing both through scarcity-inducing unit conversions and, even in the absence of unit conversions, because homeowners and tenants who are willing to host part-time STRs can bid up the price of housing. The latter channel requires comparative econometric modelling to measure; while this has not been conducted in Canada (and is outside the scope of this paper), Barron et al. (2017) analyzed the 100 largest metropolitan areas in the United States to determine that an increase in the number of Airbnb listings in a neighborhood results in a systematic increase in both rents and house prices, an effect which was stronger in neighborhoods with low rates of owner occupation. Since the US and Canada have similar housing systems and similar STR dynamics, it is likely that Canadian housing has likewise become more expensive due to the growth of STRs.

The first channel—conversions of long-term housing units to short-term rentals—is amenable to estimation if not direct measurement. If an entire-home unit is rented for 365 nights in a year, it cannot possibly also be available in the long-term housing market, while an entire-home unit rented 30 nights in a year is more likely to be a long-term residence whose occupant was frequently out

of town. To estimate STR-induced housing loss, we define a threshold of activity for entire-home listings. Frequently rented entire-home listings (FREH) are those which were available for rent at least half the year (183 nights) and actually rented at least 90 nights. FREH listings represent a conservative estimate for housing either directly converted to STR or under serious threat of conversion since it is highly unlikely that a home that spends the majority of the year listed on Airbnb is housing a long-term resident.

Using this estimate, Airbnb has removed approximately 31,100 units of housing from the long-term rental market (Table 2). These listings are concentrated in the Montréal, Toronto, and Vancouver metropolitan areas: in the last year, these three CMAs housed 40% of FREH listings, while only housing 36% of the country's population. Canada-wide, the number of FREH listings grew by 40%. The slowest growth rates in terms of number of listings and revenue, although still substantial, were in Canada's three largest cities. In rural areas, the number of FREH listings grew by 60%. As FREH listings represent housing units that have almost certainly been removed from the long-term rental market, such high growth rates predict a future of increased STR pressure on housing availability.

Table 2: Frequently rented entire-home listings across Canada

Geography	Number of FREH listings in the last year (% of national total)	Percent year-over-year growth in FREH listings	Revenue earned by FREH listings in the last year (% of national total)	Percent year-over-year growth in FREH revenue
CMAs	20,130 (65%)	32%	$566.6 million (58%)	36%
Montréal, Toronto, and Vancouver	*12,320 (40%)*	*23%*	*$374.0 million (39%)*	*30%*
CAs	2,520 (8%)	51%	$71.9 million (7%)	47%
Rural	8,450 (27%)	60%	$323.9 million (34%)	69%
All of Canada	*31,100 (100%)*	*40%*	*$962.4 million (100 %)*	*47%*

FREH listings are proportionately more common in rural areas (21% of total listings) than in either CAs (16%) or CMAs (13%). Congruently, rural areas derive more revenue from FREH listings (57%) than either CAs (46%) or CMAs (53%). This pattern, however, is driven by the fact that entire-home listings are more common in rural areas (95% of all listings) than in CAs (63%) or CMAs (70%). An examination of only entire-home listings reveals the reverse pattern; while FREH listings comprise 46% of entire-home listings in CMAs, they only comprise 40% in rural areas and 42% in CAs. FREH listings are growing faster than other listing types in terms of number of listings and revenue. There is a strong correlation ($\rho = 0.67$) between the proportion of revenue generated by entire-home listings and the proportion of revenue generated by FREH listings (Figure 9). In general, large CMAs earn larger portions of revenue from FREH listings than expected based on the share of revenue they earn from all entire-home listings.

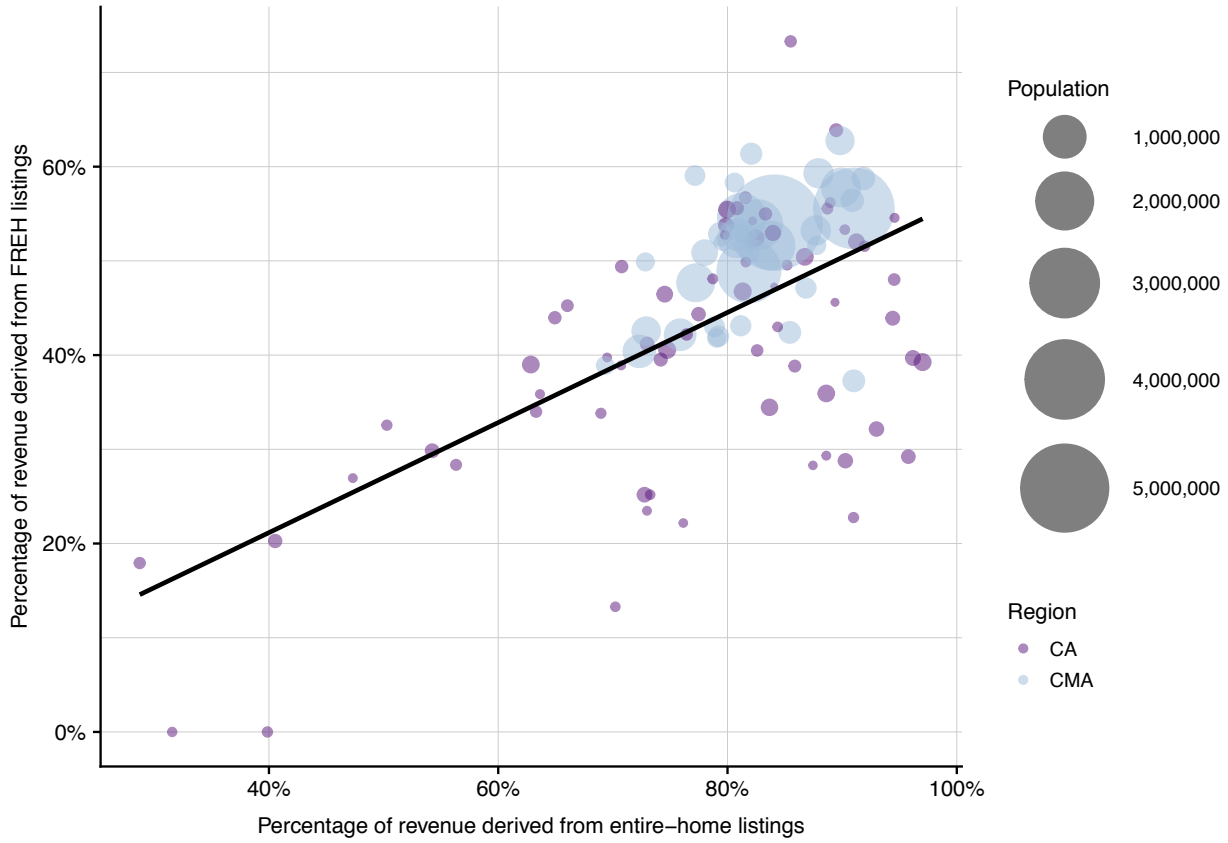

Figure 9: Percentage of revenue derived from entire-home listings and frequently rented entire-home listings

Despite substantial growth relative to other Airbnb listings, FREH listings are still a small fraction of total housing; they do not exceed more than 0.8% of total private housing units in any of Canada's CMAs. However, this fact disguises significant variation within CMAs. For example, in some census tracts in downtown Montréal, two in ten housing units are frequently rented on Airbnb (Figure 10). Similarly high rates of housing frequently rented on Airbnb can be seen outside major cities. In the small coastal vacation community of Tofino, British Columbia, approximately 18% of all housing units were frequently rented in 2018. By contrast, less than 0.05% of housing was frequently rented on Airbnb in Lethbridge, Alberta. This suggests that STR pressures on housing availability and affordability are highly localized.

A useful measure of STR impacts on housing availability is the ratio of the percentage of housing units in a CMA that are Airbnb FREH listings to the local rental vacancy rate. Cities with high percentages of the housing stock frequently rented on Airbnb and simultaneously low rental vacancy rates are areas with heightened STR-induced housing pressure—areas where fewer renters can find apartments to rent while those who can pay higher rents. In Figure 11, the cities experiencing high levels of STR-induced housing pressure are located below the trend line. Cities in British Columbia and Ontario have particularly high portions of frequently rented listings and very low vacancy rates, while cities in the Prairies exhibit relatively low levels of FREH listings but high vacancy rates.

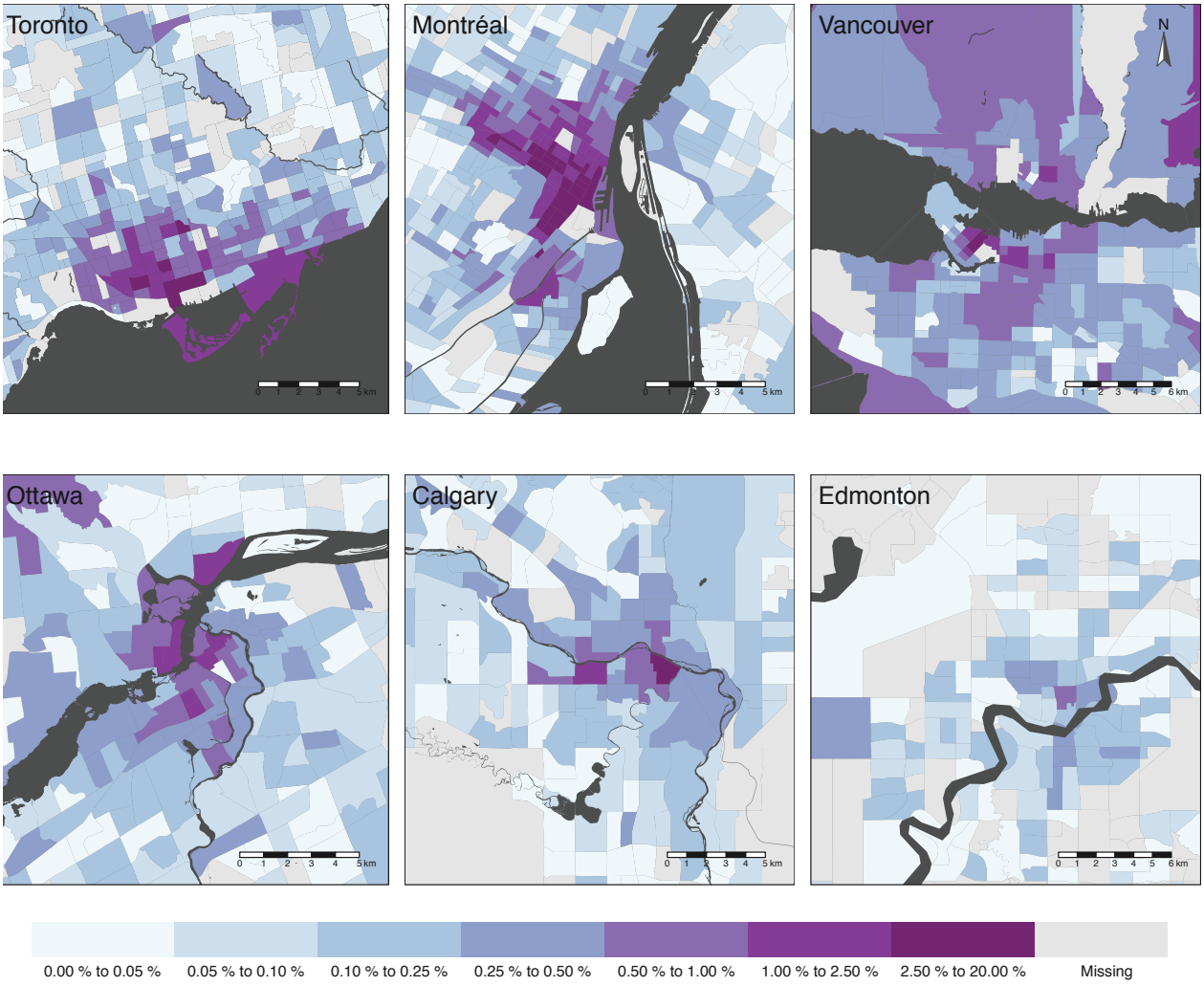

Figure 10: The proportion of housing units frequently rented on Airbnb as entire homes

Through removing housing that would otherwise be available on the long-term rental market, Airbnb is reducing housing supply and, in turn, housing affordability. These impacts are unevenly distributed. While the three largest Canadian cities have lost over 12,000 housing units from their long-term rental markets, housing loss in smaller CMAs in British Columbia (such as Kelowna and Abbotsford-Mission) is compounded by low vacancy rates and therefore may be more acutely felt. In other communities, Airbnb appears to have so far had a minor impact on housing availability, but these patterns may soon change, since Airbnb is growing significantly faster outside the major cities than within them. Particularly alarming is the high growth rate of FREH listings. Across all regions, this growth exceeds the growth in other listings, suggesting an increasing commercialization of STRs and a correspondingly increasing threat to housing affordability across Canada.

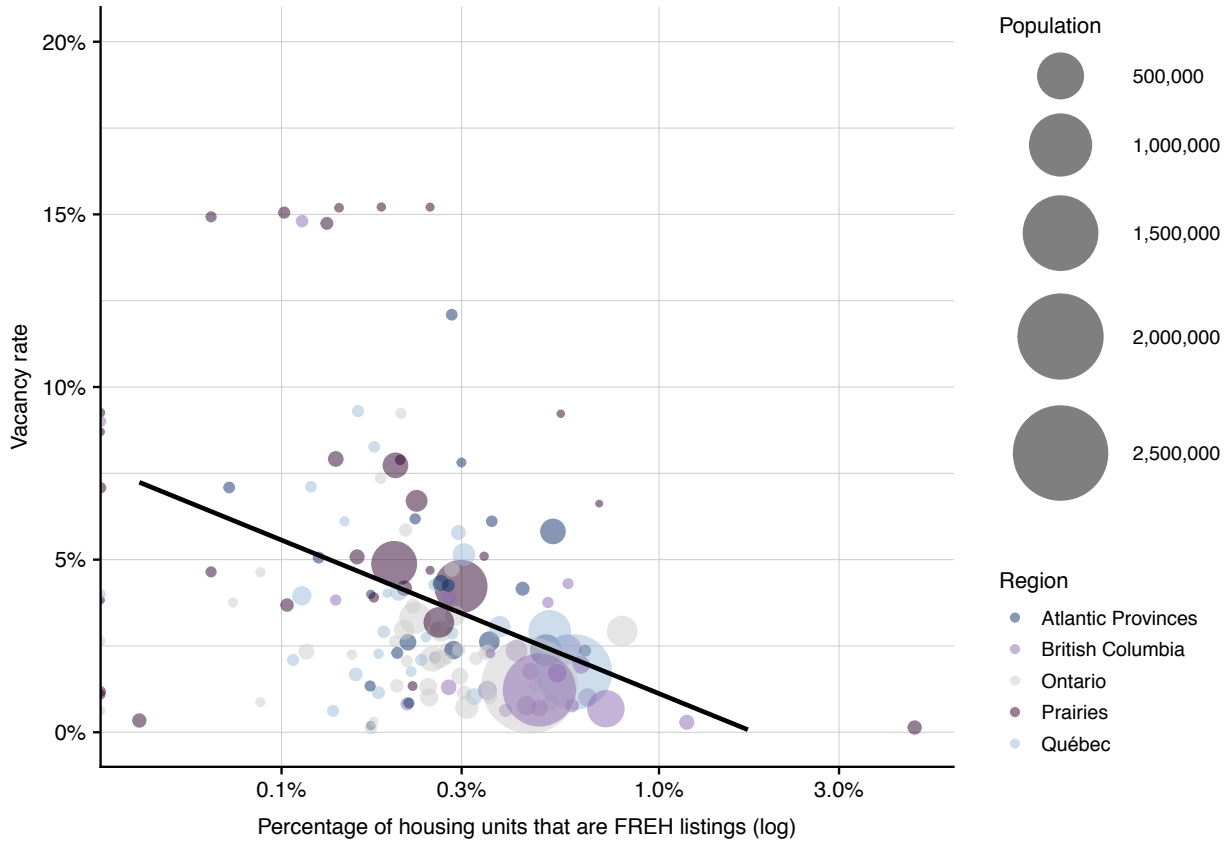

Figure 11: Vacancy rate vs. percent of housing units frequently rented on Airbnb by CMA and CA

4.5 Conclusion

This examination has provided the first comparative analysis of Airbnb activity in communities across Canada. It reveals highly uneven impacts. Across multiple metrics, Canada's largest CMAs have more concentrated and commercialized Airbnb activity than CAs and rural areas. A larger share of CMA revenue is derived from commercial multilistings, and both revenue and activity are more concentrated within specific neighborhoods and census tracts. Montréal in particular has highly concentrated Airbnb activity, with over 30% of all Airbnb revenue earned by just 1% of its hosts, and census tracts where two in ten total housing units are frequently rented on the platform. In total, Airbnb has likely removed 31,000 housing units from Canada's long-term rental markets. Of the 31,000 FREH listings, 40% of these are located in Canada's three largest CMAs and 65% are located within a CMA, although FREH listings are growing much more quickly in CAs and rural areas. Due in part to low rental vacancy rates, British Columbia's cities may be feeling the impact of high levels of Airbnb activity most acutely. Similarly, small suburbs and rural areas may face challenges regulating the explosive growth of STRs in their jurisdiction as they likely have comparatively fewer resources than larger cities with which to combat new pressures.

By examining activity relative to type, occupancy-rate status, commercial status, and location we were able to understand the extent to which various types of activity contribute to housing pressure in different contexts. The results of this analysis will be of particular interest to Canadian planners and policymakers seeking to understand the composition of listing types within their own jurisdiction. The following section expands upon this analysis by examining how listings' behavior varies throughout their lives based on these same attributes.

05

Lifecycle Analysis

5.1 Introduction

There are incontestable benefits to understanding the ins and outs of city-wide short-term rental markets. A thorough analysis allows city planners and policymakers to draft legislation that is founded upon empirical data rather than speculative assumptions, resulting in pointed regulations, enhanced outcomes and, ultimately, reduced pressure on housing stock. An amalgamated study of short-term rentals by geography, however, obfuscates pertinent and revealing facts about lifecycle characteristics that can further inform planners' and policymakers' decisions, such as:

- When are short-term rentals created?
- How much time passes before a short-term rental starts generating revenue?
- How do reservation rates and nightly prices change throughout a short-term rental's life?
- What is the average short-term rental's lifespan?

Ultimately, both forms of analysis are crucial to fully understand the activity, evolution, and impacts of localized STR markets; while the first sheds light on a market's composition, the second uses a lifecycle analysis to demonstrate how the behaviors of a market's constituent listings can be expected to vary throughout their lives, consequently allowing policymakers to proactively tailor regulations to prevent the anticipated negative externalities associated with their specific STR markets.

Given that listings' activity patterns demonstrate great variation throughout their lifetimes, a lifecycle approach allows policymakers to foresee regulatory needs by anticipating the state of future STR markets based on current data. As such, I define a short-term rental lifecycle of five distinct stages – the creation period, the ramp-up period, the active period, the wind-down period, and the takedown period – and analyze several metrics within each stage to examine the 'typical' short-term rental's experience and to understand how this experience varies based on several listing characteristics. Of key importance is the notion that listings' lives extend beyond the period in which they generate revenue. The integration of a lifecycle perspective into this short-term rental analysis introduces a cradle-to-grave approach that reinforces the significance of each and every life stage as a determinant of overall activity.

The five stages of the short-term rental lifecycle are partitioned by a set of universal events that mark listings' evolution from one stage to the next. Each listing starts its life in the creation period, a one-day life stage marking the day on which a listing becomes discoverable online by potential renters. On a listing's second day of existence it enters the ramp-up period, which extends until the day of a listing's first reservation. On the day that a listing hosts its first guests, it progresses into the active period, during which all revenue is earned. As there is a subset of listings that never

receive a reservation, not all listings enter the active period. The wind-down period succeeds the active period, starting on the first day following a listing's final reservation and lasting until the day before a listing is taken down. Finally, the takedown period designates the day on which a short-term rental's online listing is no longer publicly available. During each lifecycle stage, rentals demonstrate a number of behavioral differences: listings are created during different months, their ramp-up periods extend for vastly different amounts of time, etc. Accordingly, in this chapter I examine the extent to which differences in listing behavior in each period can be explained by listings' regions, CMAs[3], types (entire home, private room, or shared room), multilisting status, occupancy-rate status, and variations in seasonal demand.

Whereas the previous chapter made a two-way occupancy-rate distinction between part-time and frequently rented entire-home listings (defined there as rented at least 90 nights a year and available at least 183), this chapter uses a three-way distinction amongst part-time listings (entire homes rented less than 60 nights per year), frequently rented entire-home listings (FREH; entire homes rented at least 60 nights per year and available at least 120 nights per year), and very frequently rented entire-home listings (VFREH; entire homes rented at least 120 nights per year and available at least 240 nights per year). The increased granularity of this breakdown captures important differences in activity patterns that emerge based on the frequency with which listings are rented. Figure 12 demonstrates this gradient, showing a clear decrease in seasonality of occupancy rates as the number of booked nights per year increases. This gradient simultaneously validates the use of the 183 nights available/90 nights booked threshold used to estimate full-time status in Chapter 4 – it is stringent enough to capture only short-term rentals that are no longer serving full-time tenants and is representative of all listings that are booked with high frequency (as shown by its central location in Figure 12) – and confirms the benefits of using a three-way distinction to analyze lifecycle trends – there are clear distinctions between relatively infrequently rented listings, those that are rented with some frequency throughout the year, and the very top performers. As noted in the descriptions of occupancy-rate thresholds above, all comparisons involving occupancy-rate status in this chapter include only full-time listings. Since frequently and very frequently rented thresholds are used in combination with entire-home status to identify housing that may be removed from the long-term rental market, lumping all private and shared room listings with part-time entire-home listings would decrease comparability with FREH and VFREH listings and make it difficult to discern which activity patterns are determined by occupancy-rate status, and which are determined by listing type.

3 In order to identify general trends across different categories of cities, CMAs have been divided into four groups: large CMAs (Toronto, Montréal, Vancouver, Calgary, Edmonton, Ottawa – Gatineau, Québec, Winnipeg, Hamilton, and Kitchener – Cambridge – Waterloo), mid-sized CMAs (London, Oshawa, Windsor, Saskatoon, Regina, Sherbrooke, Barrie, Abbotsford – Mission, Sudbury, and Kingston), small CMAs (Brantford, Peterborough, Thunder Bay, Lethbridge, Belleville, Saguenay, Trois-Rivières, and Guelph), and touristy CMAs (St. Catharine's – Niagara, Halifax, Victoria, Kelowna, Saint John, St. John's, and Moncton).

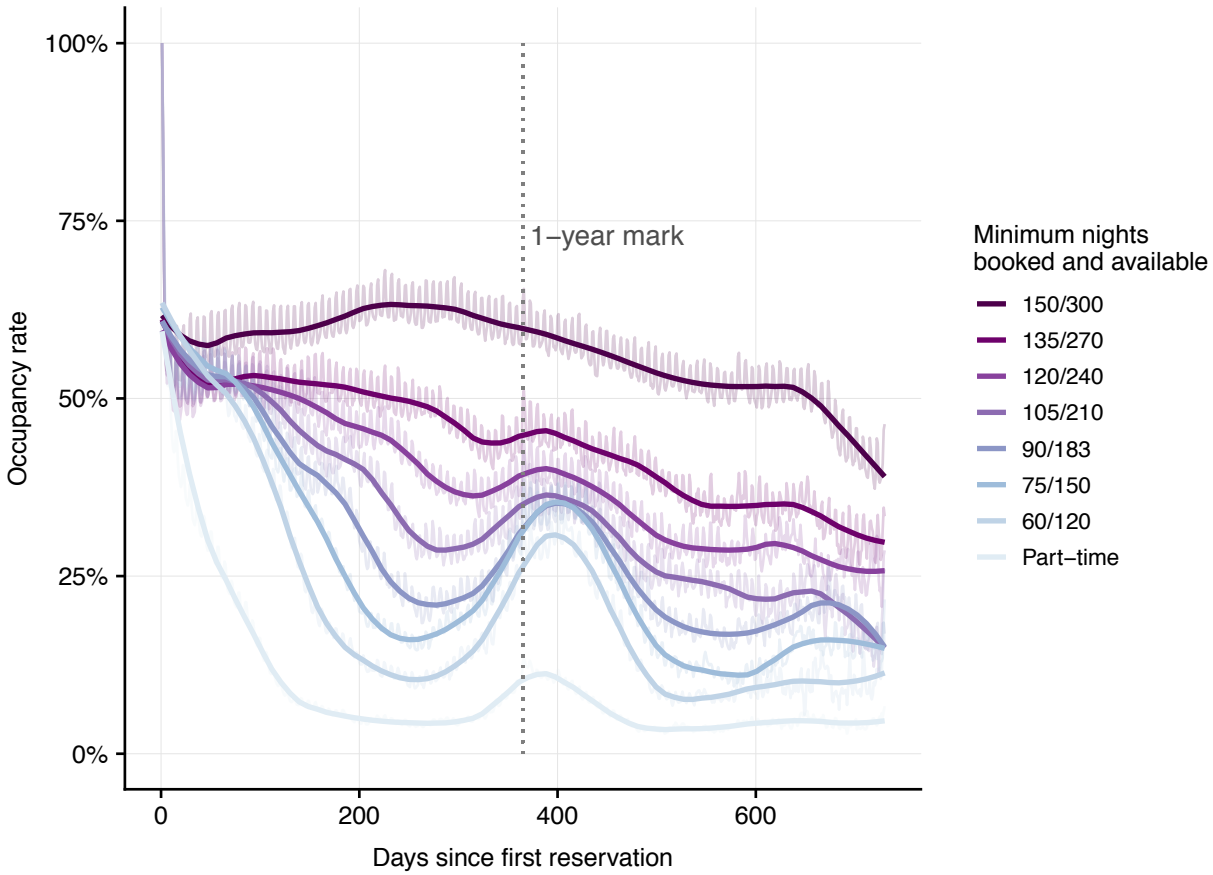

Figure 12: Occupancy rate by days since first reservation for listings at various thresholds of nights reserved and available

The results of this lifecycle analysis suggest that, if armed with knowledge of the basic characteristics of STRs within their jurisdiction, planners and policymakers can effectively predict the evolutionary patterns of, and develop targeted regulatory frameworks for, their local STR market. On average, listings experience peaks in activity from June through August, receiving their largest portion of activity during their second summer of existence, a fact that can provide insight into forthcoming growth for new markets. When analyzed by attribute, clear variations in activity appear. Part-time listings are heavily influenced by seasonal demand in each life stage (contributing to large clusters of summertime activity), whereas frequently rented and very frequently rented listings demonstrate more consistent, year-round activity. During the active period, listings in rural areas demonstrate higher levels of seasonality, higher nightly prices, and lower occupancy rates than listings in CMAs. Meanwhile, entire-home listings generate substantially higher demand than private or shared room listings, with the former experiencing substantially shorter ramp-up period durations and higher occupancy rates despite higher nightly prices.

5.2 Creation period

The first phase of a short-term rental's life begins with the creation of an online listing that indicates to potential renters that a room, apartment, or house is available to be reserved. Although short in duration, I find that the time of year in which a listing is created largely dictates when it will become active and how activity will fluctuate throughout its life. As such, insight into how creation dates vary by type, region, CMA, multilisting and occupancy-rate status can inform and contextualize differences between listings in subsequent life stages.

Across all listings, creation dates demonstrate temporal concentration, with peaks in late spring and early summer, and lulls in winter (Figure 13). This concentration of creation dates is weaker than and seasonally disparate from the concentration of revenue generation discussed in the previous chapter. Peaks in revenue generation are preceded by peaks in listing creations; whereas revenue generation is most concentrated within the month of August, listing creation is most concentrated within the month of June. Despite exhibiting weaker temporal concentration than is displayed by revenue generation, the number of listings created per month still demonstrates large variation throughout the year; overall, 50% more listings are created in summer months (33%) than in winter months (22%).

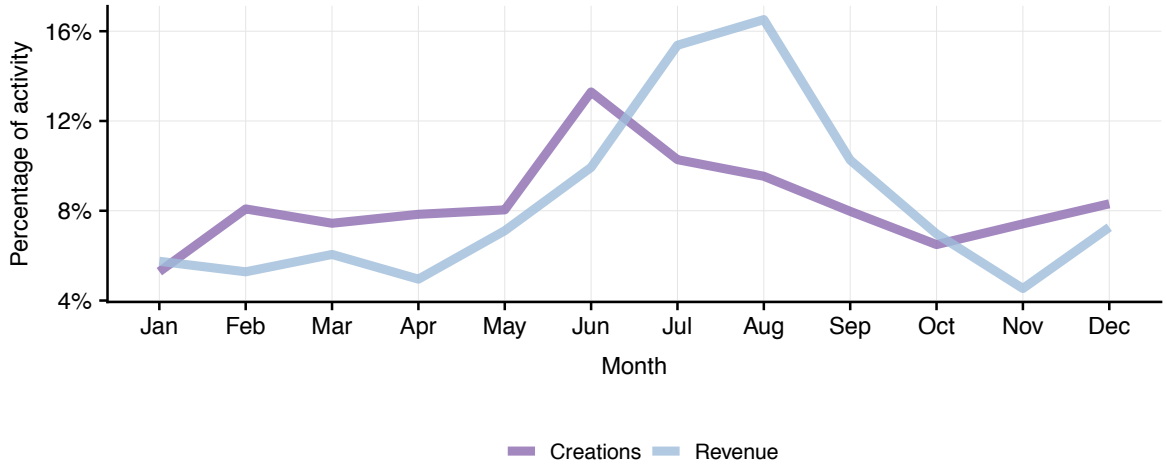

Figure 13: Comparison of temporal concentration of revenue generation vs. listing creations (growth adjusted)

When examined in conjunction with the seasonal trends of revenue generation, the seasonality of creation dates suggests that hosts create listings immediately before the summer season in order to capitalize on the disproportionate amount of activity that occurs in this period. However, hosts are not uniformly influenced by the summertime activity peak: amongst entire-home listings, part-time and FREH listings demonstrate a higher-than-average concentration of creations in late spring and early summer, while creations of VFREH listings are considerably more dispersed throughout the year (Figure 14)[4]. This variation suggests differences in part-time hosts' and full-time hosts'

4 As Figure 14 is not growth adjusted (this analysis uses 28 months of data, but a total of 32 are needed to adjust VFREH listing numbers), months at the end of the year likely show artificially elevated rates of listing creation, because the Airbnb market was larger at the end of the year than at the beginning. While somewhat unreliable for determining raw percentages of listing creation per month, Figure 14 still allows for comparisons between listings based on occupancy-rate status.

intentions: whereas part-time hosts appear eager to maximize their earnings in a short period of time, full-time hosts evince longer-term goals of leveraging short-term rentals as a continuous source of year-round income. While full-time hosts benefit from the peak in summertime activity, their earnings are maximized when listings are created as early as possible and are rented consistently regardless of season.

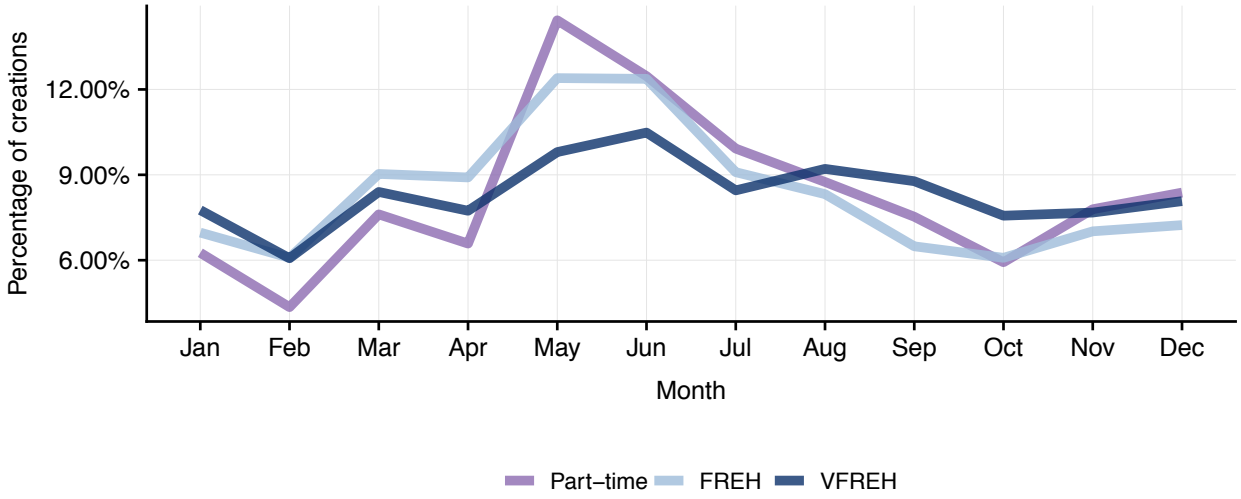

Figure 14: Listing creations per month (in 2017) by subsequent occupancy-rate status

Patterns of creation dates also demonstrate variation based on CMA group, with creations of listings in touristy CMAs exhibiting stronger-than-average pre-summertime concentrations (Figure 15). In combination with the Chapter 4 finding that Atlantic Airbnb markets are more seasonal than those in the remainder of the country, stronger creation date seasonality of listings in Atlantic CMAs suggests that concentrations of creation dates are correlated with concentrations in activity; when there is more revenue to be earned in the summer, more listings are created in a pointed effort

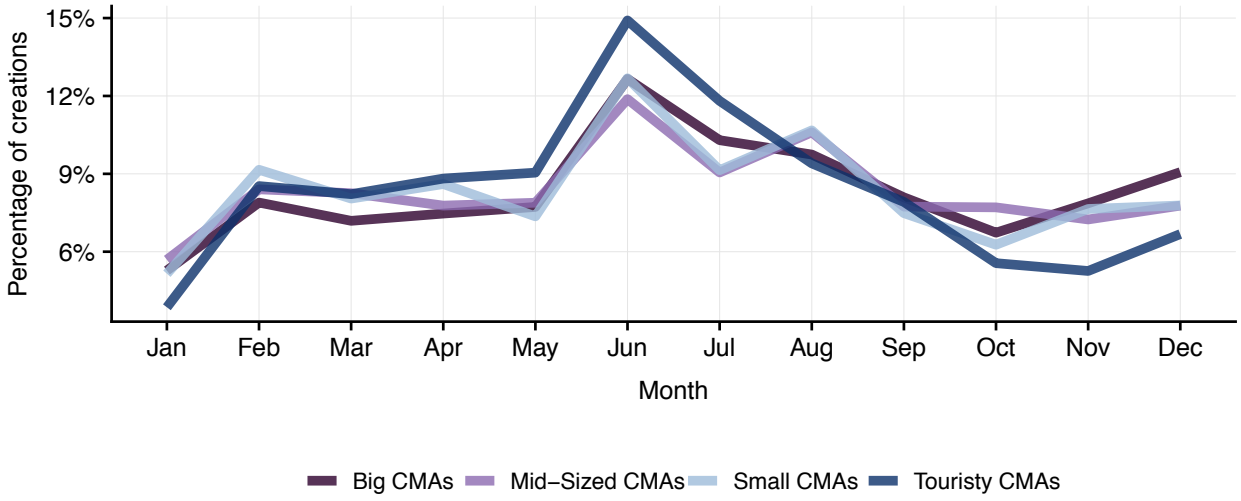

Figure 15: Listing creations per month by CMA group (growth adjusted)

to capitalize on this potential. The same seasonal demands of tourism likely explain the strong seasonal variation in creation dates of listings in touristy CMAs.

Creation dates can also shed light on the rate at which hosts commercialize. As indicated by Figure 16, the number of days between the creation of listings managed by one host reveals that the time between the activation of new listings is negatively correlated with the number of listings that a host manages. The average number of days between the creation of a host's first listing and a host's second listing is 233 days; however, the average number of days between the creation of a host's second listing and a host's third listing is only 137 days. By the time a commercial operator owns 13 STRs, they begin to acquire new listings at a rate of one per month. Once a host manages 110 STRs, there is oftentimes less than a day between subsequent listing creations.

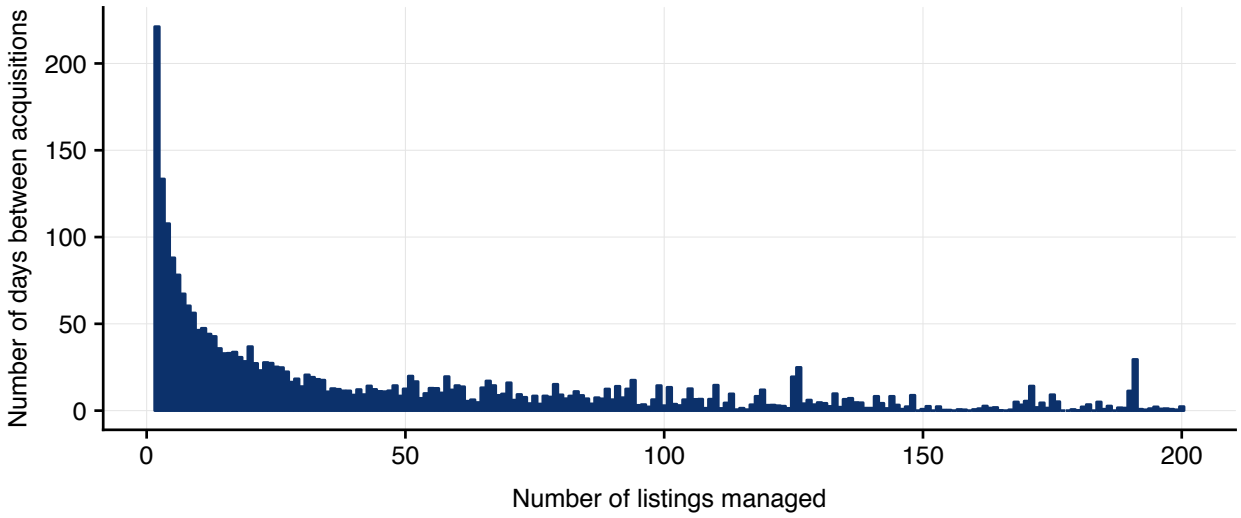

Figure 16: Number of days between acquisition of multilistings

5.3 Ramp-up period

The creation of a listing is not necessarily indicative of the start of its active life; it is common for a listing to remain unreserved for some amount of time after its creation, during a stage I describe as the ramp-up period. While listings' ramp-up period durations range from zero days to six months, a listing waits an average of 30 days before receiving its first reservation (Figure 17).

The duration of a listing's ramp-up period is generally indicative of related demand at its time of creation, as is clearly demonstrated by variation in ramp-up period durations by month (Figure 18). Listings created in summer (when demand for Airbnb listings is high) experience significantly shorter ramp-up periods than listings created during winter months, which wait an average of 22 days longer for their first reservation. In fact, seasonal differences in creation dates account for the largest variation in the durations of listings' ramp-up periods. Touristy CMAs, which experience

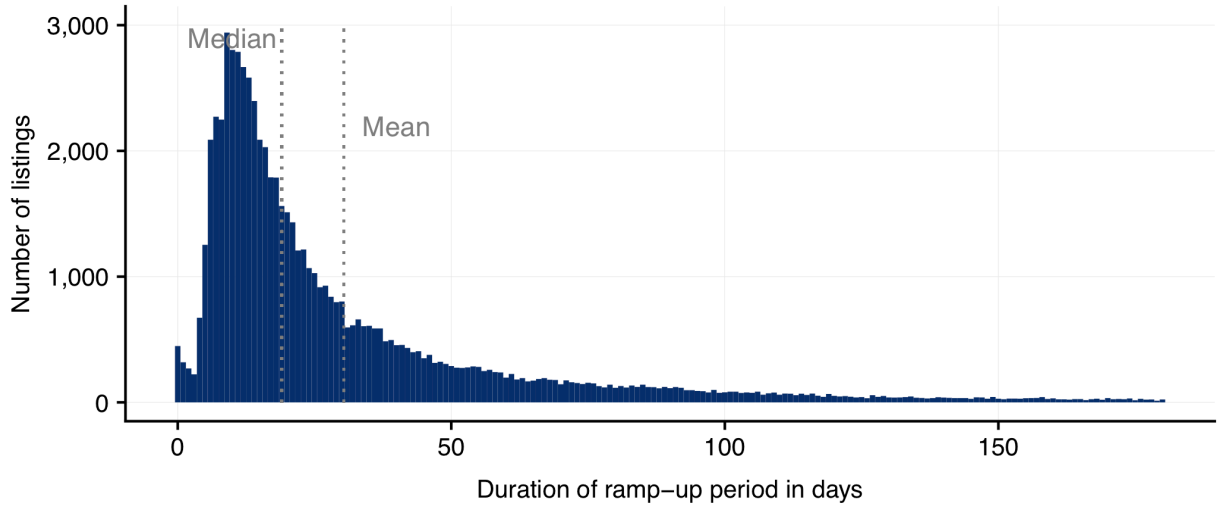

Figure 17: Histogram of ramp-up period durations in days

high levels of seasonal variation in short-term rental activity, demonstrate the most extreme seasonal variation in ramp-up period durations. Across all types of listings, ramp-up period durations demonstrate a clear decline over time (to be discussed further in section 5.6 below).

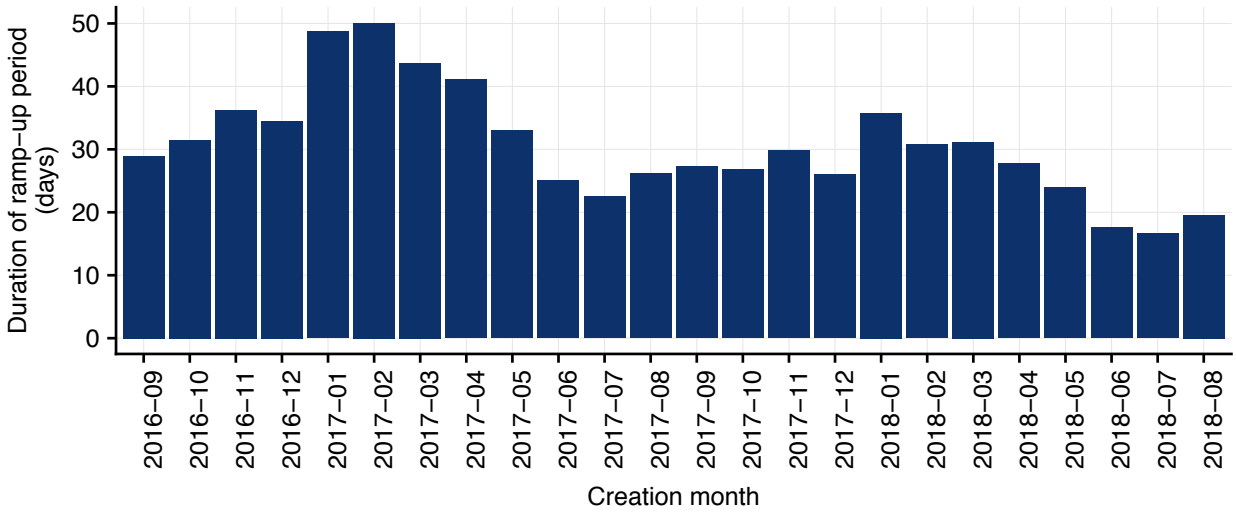

Figure 18: Number of days between a listing's creation and its first reservation, if it receives its first reservation within 6 months

Seasonality is unable to explain all variation in ramp-up period durations, however. For example, given that, amongst entire-home listings, VFREH listings are more likely to be created in the winter than part-time listings, seasonal trends in ramp-up period durations would seem to predict that VFREH listings will experience longer ramp-up periods than part-time listings. In fact, the reverse is true; VFREH listings wait an average of 26 days before their first reservation, while FREH listings

wait 30 days and part-time listings wait 32 days (Figure 19). As with VFREH listings' anomalous pattern of creation dates, this unexpected deviation in seasonal ramp-up trends could potentially be explained by differences in part-time hosts' and full-time hosts' approaches to STR management. Since FREH and VFREH listings are a major source of income for full-time hosts, they may treat their rentals as a business with a keen focus on effective listing advertisement and promotion. Any consequent reduction in ramp-up period durations would therefore demonstrate full-time hosts' ability to alter short-term rental patterns characteristic of casual home-sharers and implicate full-time hosts as a major source of short-term rental intensification.

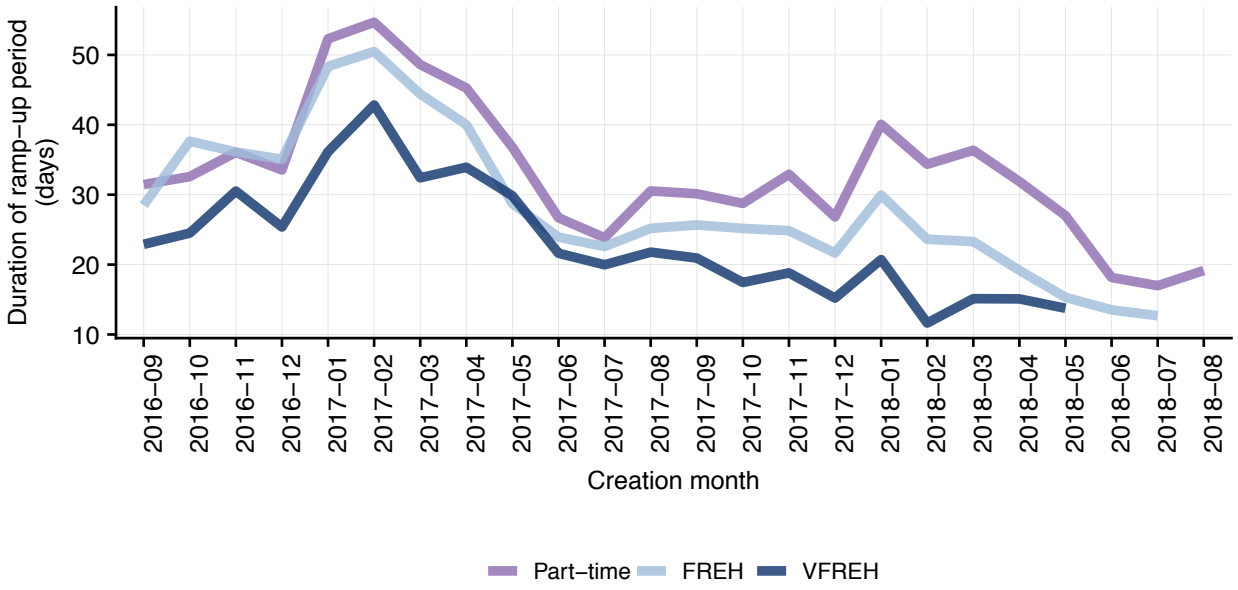

Figure 19: Ramp-up period durations in days by subsequent occupancy-rate status

A listing's region also influences the overall length of the ramp-up period. Listings in CMAs consistently receive their first reservation sooner after creation than listings in CAs and in rural areas, suggesting higher demand for short-term rentals in urban regions (Figure 20). Ramp-up period durations of listings in rural areas show the most seasonal variation, averaging 20 days longer than ramp-up periods of CMA listings in the winter, but only 5 days longer than ramp-up periods of CMA listings in the summer. The considerable seasonal variation in rural listings' ramp-up period durations implies that they experience the largest differences in seasonal demand. Across CMAs, listings in touristy CMAs experience the greatest seasonal variation in ramp-up durations as a consequence of the seasonal nature of short-term rental demand in these cities.

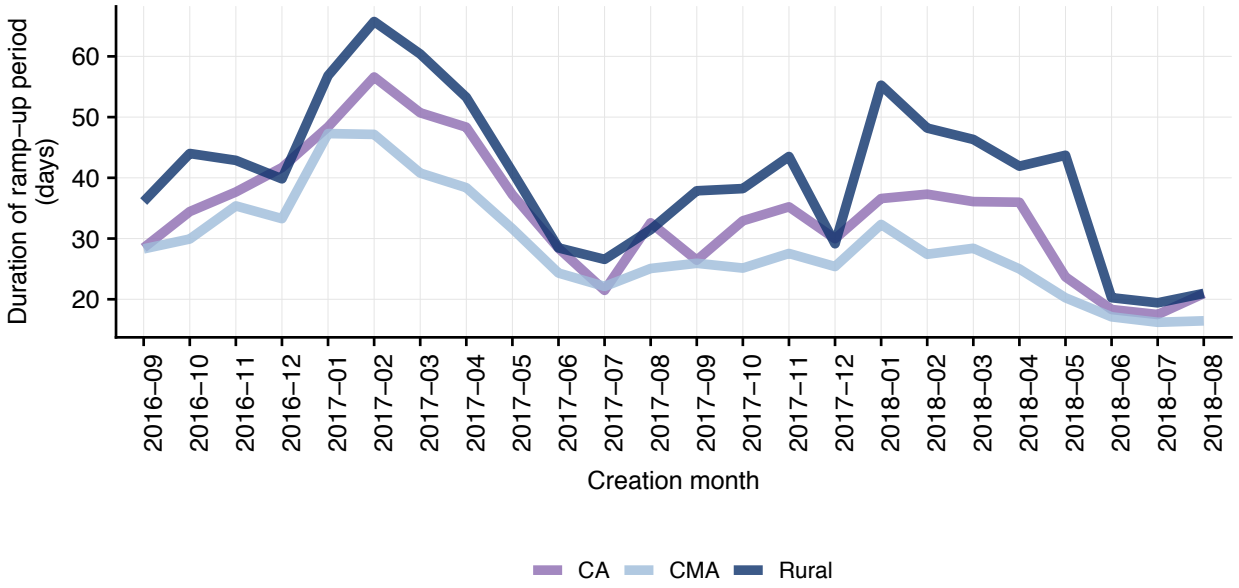

Figure 20: Ramp-up period durations in days by region

5.4 Active period

The active period refers to the portion of a listing's life during which it receives reservations and earns money. Within this period, listings exhibit variation in daily earnings and occupancy rates by type, region, CMA, occupancy-rate status, multilisting status, and season. In order to increase the comparability of the active periods of listings with different creation dates and ramp-up period durations, daily earnings and occupancy rates have been normalized with respect to the number of days since a listing's first reservation. Active period metrics are highly correlated with listings' overall success, and as such, they are discussed in parallel with listings' total lifetime revenues.

Overall, 83% of listings receive a reservation throughout their life, while the remaining 17% never enter the active period. After removing those listings which are likely to be commercially operated, over one in four of the remaining listings never receive a single reservation. There is significant variation amongst the percentage of listings that never receive a reservation amongst CMAs, with listings in large cities such as Montréal, Toronto and Vancouver displaying the highest percentage of inactive listings (19%) while listings in touristy CMAs display the lowest percentage of inactive listings (14%). The low rates of inactive listings in CMAs with elevated levels of tourism is likely explained by the temporal concentration of visits to these areas. When above-normal numbers of tourists converge on one STR market at the same time (as is known to happen during summer in touristy CMAs), they must necessarily make use of a higher percentage of the STR market's available listings.

On average, listings are booked for 27% of their active period and earn $98 per reserved night.

Figure 21 demonstrates that nightly earnings increase quickly following listings' first reservations, before continuing a more gradual increase for slightly more than the first year of active life. Just after the one-year mark, earnings begin to fall, dropping below their inaugural earnings for the first time approximately two years after the start of activity. Occupancy rates demonstrate a similar trend (Figure 22). Starting at 100% for all listings (an artefact of normalizing by days since a listing's first reservation), occupancy rates decline throughout the first half year of a listing's life, before increasing until just after the one-year mark. Although slightly reduced, occupancy rates demonstrate this same cyclical pattern throughout their second year of life as well. Across all listings, the median total lifetime revenue is $2,390.

The cyclical nature of both occupancy rates and daily earnings is an artefact of the concentration of listing creations in the late spring and early summer months. Figure 23 demonstrates a breakdown of seasonality's effects on daily earnings. Listings which receive their first reservation during the early summer see high daily revenue at the very start of their active lives, whereas listings which receive their first reservation in the fall or winter begin their lives receiving relatively low earnings. One hundred thirty days later, however, the tables turn, and listings created in the winter experience the summertime revenue peak while listings created in the summer experience the wintertime lull in daily prices. Similarly, while all listings experience an immediate drop in occupancy rates, the length of time before occupancy rates experience an increase is strongly correlated with the month in which a listing receives its first reservation (Figure 24). As increases in occupancy rates are strongly correlated with increases in summertime demand, listings created between February and May see relatively quick growth in occupancy rates, while listings created between September and January wait approximately 250 days before seeing their own increase.

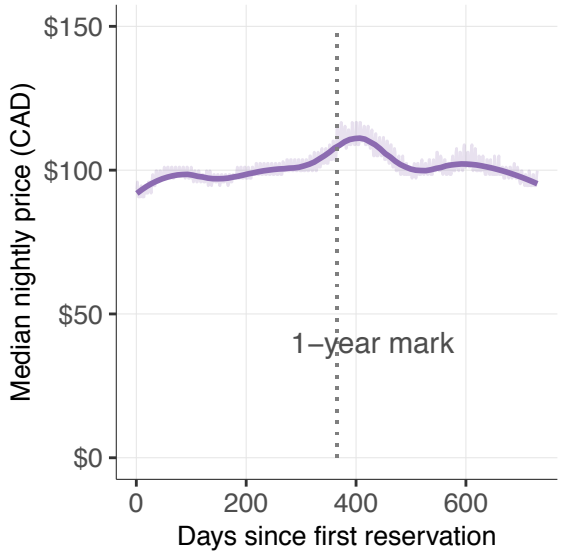

Figure 21: Normalized median price per night for all listings

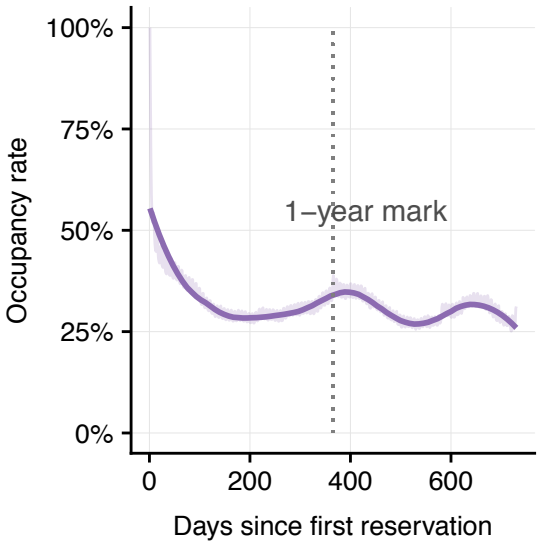

Figure 22: Normalized daily occupancy rates for all listings

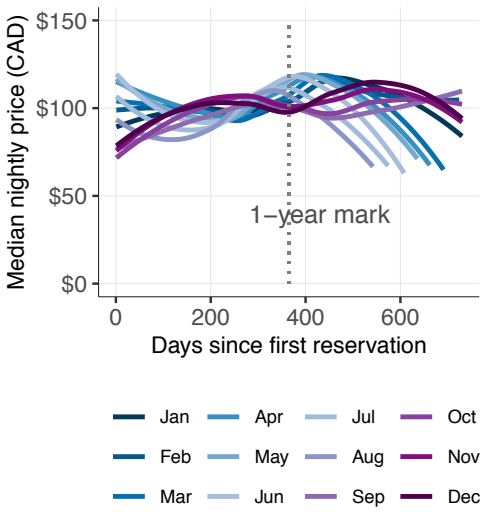

Figure 23: Normalized median price per night by month of creation

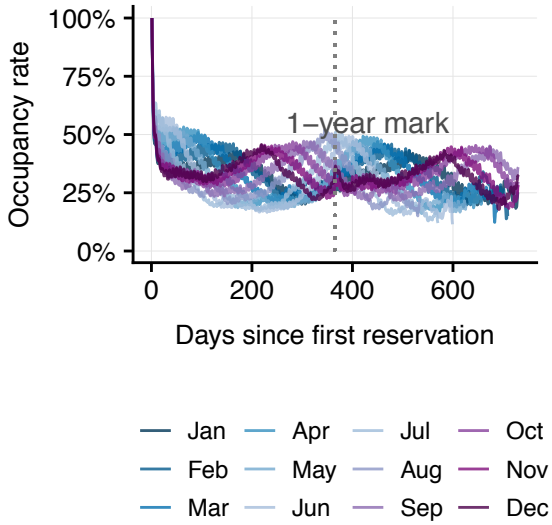

Figure 24: Normalized daily occupancy rates by month of creation

Daily revenue and occupancy rates are thus highly dependent on seasonality, and the month in which a listing is created greatly affects how many days into the active period a listing experiences peaks and lulls in both. Given that listing creations are not evenly distributed throughout the year, the seasonal patterns of the majority, those created in summer, remain evident in overall trends despite normalization. The cyclical peaks in occupancy rates and median daily earnings therefore correspond to summer for the majority of listings. Thus, it is clear from Figure 21 that listings see the largest chunk of their life's action during their second summer in existence. Interestingly, while occupancy rates peak for a third time in what corresponds to summer three for most listings, daily prices do not show a parallel increase. This discrepancy is largely explained by a steady decline in STR prices over time. Whereas listings' median price on day one includes prices from reservations occurring as early as September 2016 and as late as December 2018, listings' median price on day 600 (when occupancy rates start to see their third peak) can only include prices recorded on or after April 24, 2018 as this is exactly 600 days following the start of the study period (September 1, 2016). Therefore, early median prices are pulled up by the higher nightly prices of the past, while later median prices increasingly incorporate only more recent and lower-earning reservations.

As with the creation and ramp-up periods, fluctuation in activity over time is primarily explained by seasonal variations, but fixed differences in activity are largely driven by differences in listings' type, region, CMA, and occupancy-rate status. While listings in rural areas receive a median of $158 per reserved night throughout their lives, listings in CAs and CMAs receive medians of $110 and $88 respectively (Figure 25). Differences in total earnings amongst these three types of listings are mitigated by the fact that occupancy rates demonstrate the opposite pattern: listings in CMAs consistently demonstrate the highest average occupancy rates (29%) while listings in rural areas regularly exhibit the lowest average occupancy rates (24%) (Figure 26). As was identified

in the ramp-up period as well, demand for rural listings shows the greatest seasonal dependence, with large summertime peaks in occupancy rates. Rural listings also demonstrate the most variation in occupancy rates at the weekly scale, suggesting that they have the largest dependence on weekend vacationers. Conversely, listings in CMAs and CAs experience relatively consistent levels of demand thanks to weekday business travelers. By region, nightly price is a better predictor of total lifetime earnings than occupancy rates: despite no significant difference in total length of the active period, listings in CMAs earn a median lifetime revenue of $2,220, while listings in rural areas earn a median lifetime revenue of $3,880.

Listings also exhibit different patterns of median daily earnings across CMAs. Overall, listings in touristy CMAs earn more per reserved night ($104) than listings in large ($88), mid-sized ($74), and small CMAs ($74) (Figure 27). While listings in large cities experience a gradual increase in daily earnings throughout their first year of activity followed by a gradual decrease in daily earnings

Figure 27: Normalized median price per night by CMA group

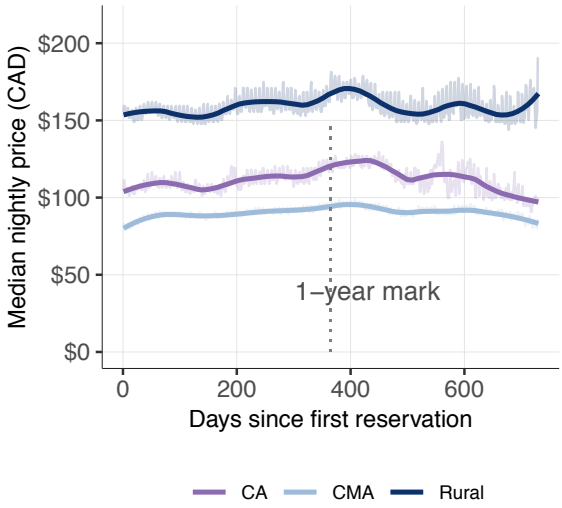

Figure 25: Normalized median price per night by region

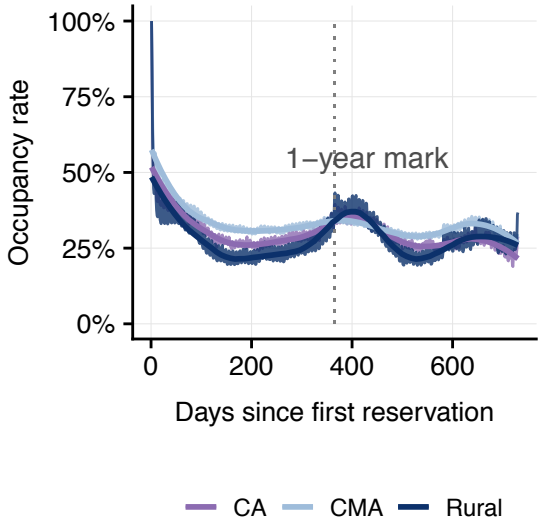

Figure 26: Normalized daily occupancy rates by region

for the remainder of their lives, listings in touristy CMAs demonstrate significantly greater seasonality. There are less dramatic differences in occupancy rates across the different CMA groups, however. Listings in touristy CMAs have the highest average occupancy rates, and their seasonality is clearly visible here as well (Figure 28). As a result of touristy listings' higher average nightly prices and occupancy rates, these listings earn the highest median lifetime revenue at $3,350. Listings in large CMAs earn the second-highest median lifetime revenue ($2,180), while

low nightly prices in small and mid-sized cities result in low total earnings for listings in these areas ($1,860 and $1,690, respectively).

Listings of different types see relatively congruous patterns of revenue generation throughout their lives, but fixed differences in daily earnings. Entire-home listings earn substantially more per reserved night ($126) than either private rooms ($49) or shared rooms ($32) (Figure 29). Entire-home listings also have higher occupancy rates (29%) than private rooms (24%) or shared rooms (18%), suggesting that there is more demand for entire-home STRs (Figure 30). Together, the effects of listing type on daily earnings and on occupancy rates contribute to significantly higher median lifetime earnings for entire-home listings ($4,120) than private rooms ($1,160) and shared rooms ($570).

The occupancy-rate status of entire-home listings is (of course) a strong influencer of occupancy rates, but has relatively small effects on daily prices. Part-time listings and FREH listings have the highest median price per night ($130), while VFREH listings charge slightly less ($123 per night) (Figure 31). Each category of listing demonstrates distinct variations in price per night throughout their lifetimes. VFREH listings maintain the most stability: nightly prices demonstrate a very gradual increase until the one-year mark, at which point they level off. Conversely, median nightly prices of FREH listings and part-time listings demonstrate significant variation throughout their lives, with coincident peaks at the one-year mark.

VFREH listings necessarily have the highest average occupancy rates, with 51% of listings receiving a reservation on any given night. FREH

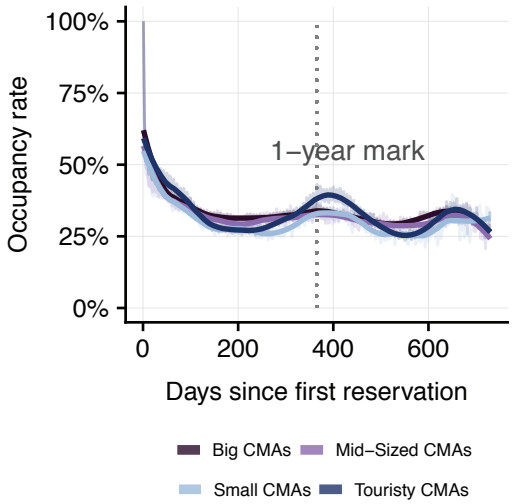

Figure 28: Normalized daily occupancy rates by CMA group

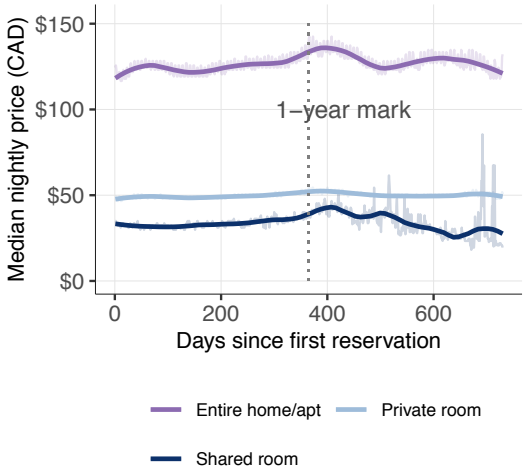

Figure 29: Normalized median price per night by listing type

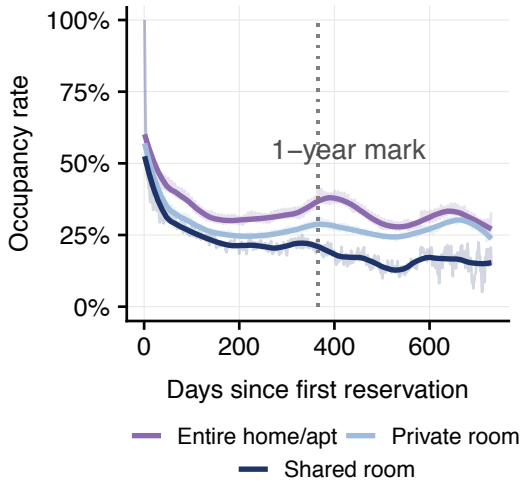

Figure 30: Normalized daily occupancy rates by listing type

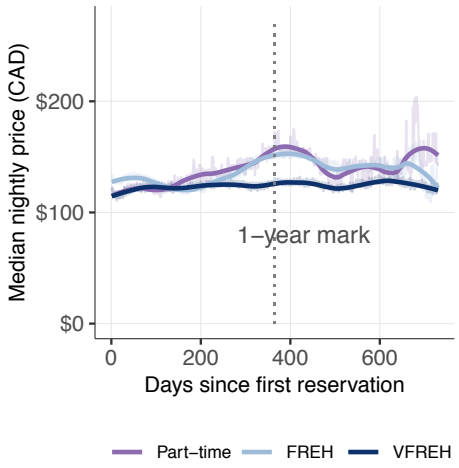

Figure 31: Normalized median price per night by subsequent occupancy-rate status

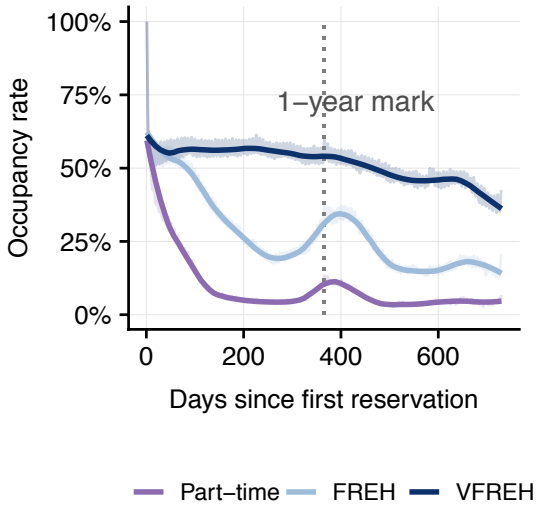

Figure 32: Normalized daily occupancy rates by subsequent occupancy-rate status

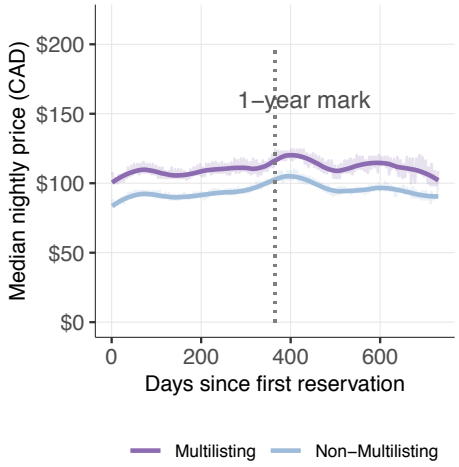

Figure 33: Normalized median price per night by multilisting status

listings' average occupancy rates of 32%, while part-time listings' average occupancy rates fall much lower, near 13% (Figure 32). FREH listings and part-time listings demonstrate notable similarities in occupancy rate fluctuations over time; both types of listings exhibit strong seasonal variations. FREH listings' propensity to behave more similarly to part-time listings than to VFREH listings (a recurring pattern visible in the distribution of listing creations by occupancy-rate status as well) suggests that the threshold of 60 nights rented and 120 nights available may not be conservative enough to only capture listings that are dedicated short-term rentals.

Unlike part-time and FREH listings, VFREH listings' occupancy rates remain stable throughout the first year of their life, before beginning a slow decline throughout the second year. As VFREH listings do not have a strong seasonal pattern to their listing creation dates, it is difficult to discern cyclical patterns in their occupancy rates. That is not to say that VFREH listings do not demonstrate seasonal variations in their occupancy rates (in fact, they follow the same general pattern as all listings, with higher occupancy rates in the summer, and lower occupancy rates in the winter), but rather that the relatively dispersed nature of VFREH listing creations causes individual VFREH seasonal patterns to nullify each other in Figure 32. Amongst listings categorized by occupancy-rate status, it is clear that occupancy rate is the primary determinant of lifetime earnings: despite their lower median daily earnings, VFREH listings ($32,260) earn $17,450 more than FREH listings ($14,810) and $30,020 more than part-time listings ($2,240) during their lifetime.

Despite relatively weak effects on creation date

and ramp-up period duration, multilisting status influences both occupancy rates and daily prices. Multilistings demonstrate consistently higher occupancy rates and prices per reserved night than non-multilistings. On average, multilistings earn $110 per night and are booked 32% of the time, while non-multilistings earn $93 per night and are booked 25% of the time (Figures 33 and 34). Both multilistings and non-multilistings demonstrate very consistent seasonality in occupancy rates and daily earnings. Together, multilistings' higher occupancy rates and daily earnings contributes to a higher median lifetime revenue: multilistings generate $3,280 in revenue, while the median non-multilisting only earns $1,770 throughout its life.

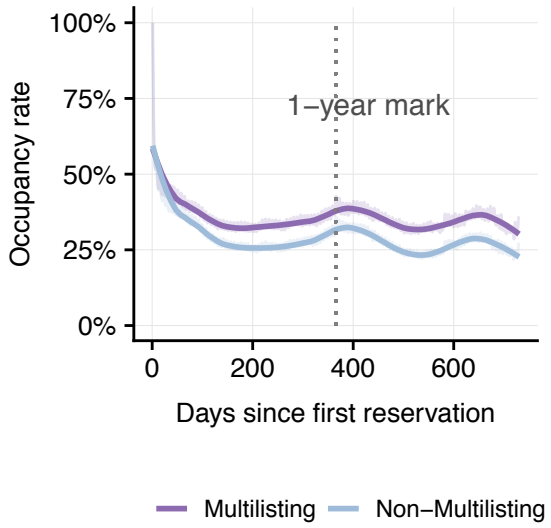

Figure 34: Normalized daily occupancy rates by multilisting status

5.5 Wind-down period

Short-term rentals are not typically removed the day after their last reservation. As such, most active listings experience a wind-down period lasting from the date of their last reservation to the date on which their online listing is removed from Airbnb's website. An awareness of average wind-down period durations, in combination with information about average ramp-up period durations, can provide insight into the percentage of STRs that are actively earning revenue at any given point in time.

The duration of the wind-down period of entire-home listings is largely determined by a listing's occupancy-rate status: VFREH listings average wind-down period durations of 7 days, FREH listings average wind-down period durations of 12 days, and part-time listings average wind-down period durations of 17 days. The wind-down periods of FREH and VFREH listings may potentially be shorter because full-time hosts are (1) more reactive to inactivity, pulling a listing as soon as it stops making money or (2) more likely to deliberately takedown an active listing. Conversely, part-time hosts are less likely to make calculating STR decisions regarding a unit's highest and best use and have less inclination to pull a listing while it is, or as soon as it stops, generating revenue. Since part-time hosts are oftentimes renting out spare rooms or second homes when they are not in use, Airbnb offers them the best chance to earn extra money from their property with minimal effort. If these listings are either going to sit empty, or earn the hosts some extra money, part-time hosts might as well maintain the listings, even when reservations are infrequent or hit a long lull.

Listings created in the late spring and summer have shorter average wind-down periods (14 days) than listings created during the fall or winter (18 days). This seasonal variation suggests that, following summer's high occupancy rates and relatively consistent reservations, hosts intentionally remove their listings. The deliberate takedown of regularly active summertime listings would contribute to substantially reduced wind-down period durations of summertime-only listings.

5.6 Takedown period

As with creation dates, takedown dates display temporal concentration; across all categories of listings, the largest percentage of takedowns occurs in August. As depicted by Figure 35, listing creations and listing takedowns bookend peak activity, offering further proof that a large number of listings are created by hosts who want to capitalize on summertime activity. A listing's average length of life by month of creation adds to this point as well; listings created in summer last an average of 287 days while listings created in the fall and winter last an average of 325 days. The life lengths of listings created in the summer are likely pulled down by listings that only last for that season. While listings created in the winter are equally likely to be taken down following their first summer, their earlier creation date contributes to longer average life lengths.

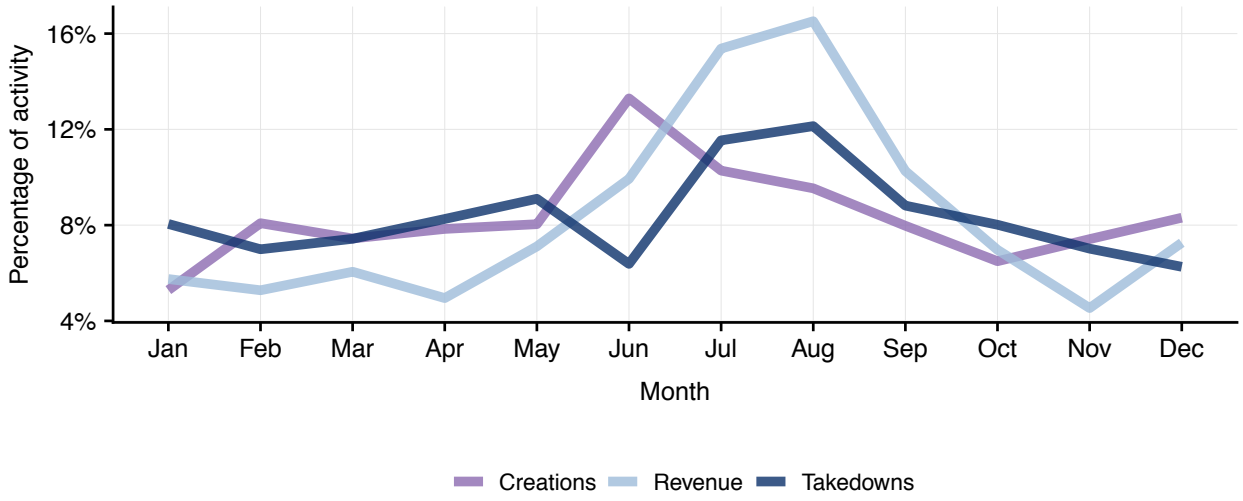

Figure 35: Listing creations, revenue, and listing takedowns per month

Takedowns of entire-home listings per month show slight variation by occupancy-rate status; part-time listings are more likely to be taken down in late summer or fall than FREH or VFREH listings. Given that (1) summertime-only listings are known to have short lives and end-of-summer takedowns, and (2) that these listings are highly likely to be classified as part-time given their short life lengths, it is not surprising that part-time listings see more concentrated takedowns than FREH or VFREH listings (Figure 36)[5]

5 As with Figure 14 above, Figure 36 is not growth adjusted because the data does not extend far back enough in time, and thus likely understates activity at the beginning of the year and overstates activity at the end of the year.

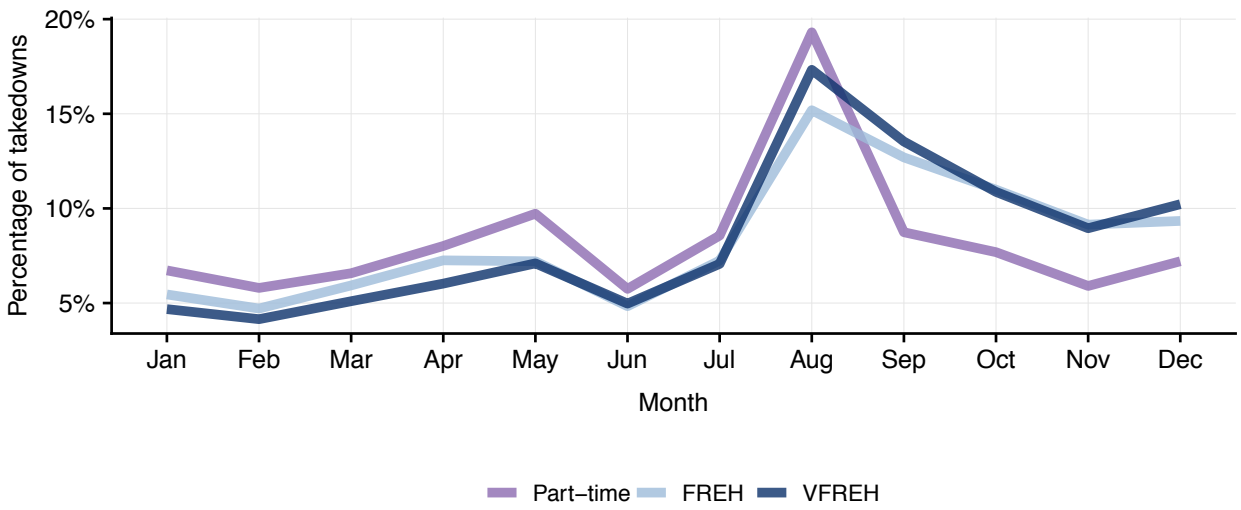

Figure 36: Listing takedowns per month (in 2018) by subsequent occupancy-rate status

Unsurprisingly, differences in total life length show more variation by occupancy-rate status than takedown dates: VFREH listings last a median of 504 days while FREH listings last a median of 378 days and part-time listings last a median of 228 days. The median life length of part-time listings is pulled down by short, seasonal rentals while the median life length of FREH and VFREH listings is considerably higher since they must necessarily be in existence for at least 120 or 240 days to obtain their status.

5.7 Other Factors

In addition to clear variations by region, CMA, type, multilisting status, and occupancy-rate status, listings' activity in each lifecycle stage is also changing over time. First, the duration of the average ramp-up period has steadily declined over the two-year study period, decreasing by 44% year over year. Whereas listings created between September 2016 and August 2017 waited an average of 51 days before receiving their first booking, listings created between September 2017 and August 2018 only waited an average of 31 days. Moreover, the duration of ramp-up periods of FREH and VFREH listings are dropping faster than those of part-time listings, suggesting that FREH and VFREH listings' activity is intensifying faster than part-time listings' activity.

Second, there has been a slight year-over-year decrease in the amount of money a listing earns on day x of its life (Figure 37). On average, short-term rentals received 3.7% less per day in the last twelve months than they did in the previous year. This slight drop in median earnings per reserved night may be a consequence of the large growth of the Canadian Airbnb market over the last year; if the supply of STRs is growing faster than demand, prices would predictably demonstrate steady decreases.

Third, listing lifetime lengths are trending upwards over time. Figure 38 illustrates the median

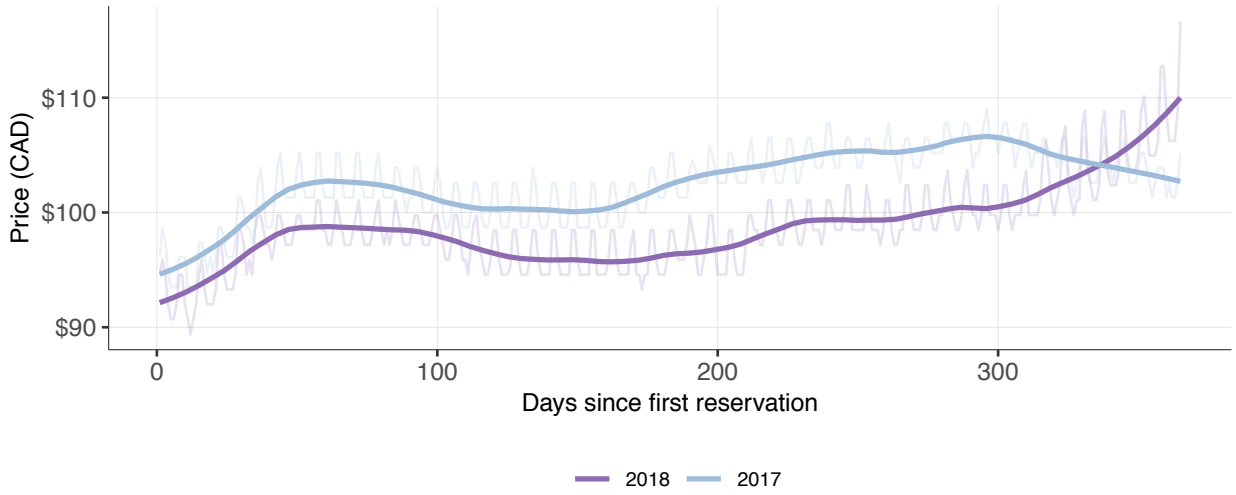

Figure 37: Price per night over time

lifespan of listings that died in each month. There is a large variation in median lifespan over time, with listings taken down in September 2016 lasting an average of 103 days and listings taken down in December 2018 lasting an average of 178 days. The large spike in median listing lengths in August 2018 coincides with the introduction of new short-term rental regulations in Vancouver; these regulations, which stipulate that hosts can only offer STRs in their primary residence, resulted in the removal of over 3,000 listings. As demonstrated by Rathwell et al. (2019), listing purges performed by Airbnb in order to comply with municipal regulations typically result in the removal of a large number of inactive and low-performing listings, leaving the market saturated with full-time, high performers. As such, it is likely that the Vancouver takedowns primarily targeted dead listings that remained posted online despite being essentially defunct. As forgotten listings can remain for years, their concentrated removal significantly increased the median lifespan of listings removed in August 2018.

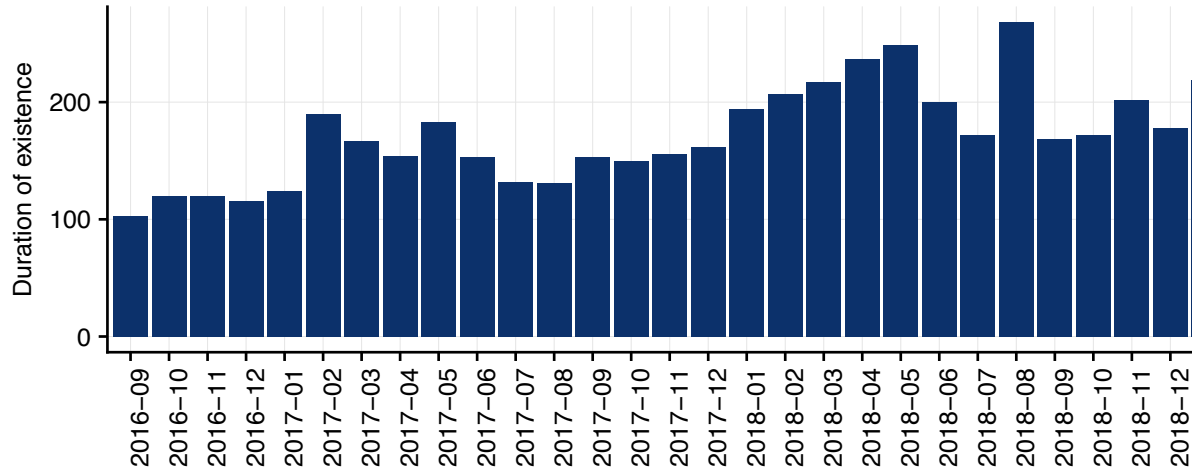

Figure 38: Median listing lifespan by month of takedown

5.8 Conclusion

The process of viewing STR activity patterns through a lifecycle framework illustrates variations in activity that are correlated with a listing's region, CMA, type, multilisting status, and occupancy-rate status. The results of this research shed light on patterns that are unique to specific categories of STRs and may be a useful supplement to planners and policymakers intent on developing targeted and effective regulations. Given that a large portion of listings receive the majority of their activity during summer, locales with particularly seasonal STR markets may wish to develop regulations that mitigate the negative impacts of temporally-concentrated visits. Conversely, cities with a lot of VFREH listings, and consequently consistent STR activity, may find it more effective to limit the number of nights which a listing may be reserved. Further analysis indicates that listings' occupancy rates can clarify the relationship between the number of listings in a given STR market and the number of visitors occupying STRs on a given day; this knowledge may be used to improve estimates of STRs' impacts on traffic and neighborhood disruption. Similarly, knowledge of average ramp-up and wind-down period durations can help city officials estimate the percent of listings that are active at any given point. It is this level of specificity and understanding of the effects of listings' attributes on activity rates that allows for localized regulatory solutions to STR problems.

Before planners can complete a detailed analysis of the effects of listing attributes on activity at the local level, however, they must first understand the composition of listings within their short-term rental market. It is the combination of these two analyses that allows for the creation of well-founded, comprehensive, and effective policies. The outcome of this marriage is a specialized and anticipatory approach to planning which mitigates the negative effects of STRs further than would be possible with the use of a standard analysis.

06

Conclusion

This study has presented the first comparative analysis of Canadian Airbnb activity and provided an approach for understanding and predicting activity in individual short-term rental markets with the joint aim of facilitating empirically-grounded short-term rental regulations. Canada's CMAs demonstrate more concentration and commercialization of Airbnb activity than CAs and rural areas; a larger share of CMA revenue is generated by frequently rented entire-home (FREH) listings and multilistings and this revenue tends to be concentrated within specific neighborhoods and census tracts. Over 31,000 units have likely been removed from the long-term rental market at the hands of FREH listings. While 65% of these FREH listings are currently located within CMAs, they, along with overall activity, revenue, and multilistings, are growing at faster rates in CAs and rural areas.

Several listing characteristics are strongly correlated with fluctuations in short-term rentals' daily activity. Listing creations typically demonstrate large peaks in the late spring and early summer, with the exception of VFREH listings, whose creations are spread more uniformly throughout the year. Listings in touristy CMAs show the largest seasonal variation in listing creations, likely as a result of seasonally-driven changes in demand for tourist accommodations. Across all listings, ramp-up period durations are trending downwards, with VFREH listings and listings in CMAs exhibiting the shortest average wait for their first reservations. During the active period, occupancy-rate status is a strong predictor of earnings, with VFREH listings charging less than part-time listings, but earning substantially higher median lifetime revenues. Large differences appear between listings based on type as well; entire-home listings charge the highest nightly prices and have the highest occupancy rates, and consequently earn significantly higher lifetime revenue than either private or shared rooms. The duration of the wind-down period is substantially shorter for listings created during the late spring and early summer months, suggesting that a large number of hosts deliberately remove their listings once the summertime peak in earnings subsides. Peaks in listing creations and in listing takedowns bookend the summertime peak in revenue, corroborating this notion.

In order to curb the increasing levels of concentration and commercialization observed in Airbnb markets across Canada, policymakers are increasingly turning towards regulations. In Canada, the province of Québec introduced the first legislation aimed at regulating STRs and collecting tax revenue in 2016 (CBC News, 2017). More recently, Toronto, Vancouver and Montréal's largest borough, Ville-Marie, have followed suit, adopting more stringent STR regulations. As of the end of 2018, Calgary, Ottawa, Edmonton, Saskatoon and many smaller jurisdictions were studying the possibility of new regulations, with almost 50% of people across the country claiming that they would like to see their local community regulate STRs that are not operated out of a host's primary residence (Angus Reid, 2018).

Despite the growing support for STR regulations, however, disagreements regarding their purpose endure. While affordable housing stock advocates argue for regulatory frameworks that prevent the conversion of long-term rental units to short-term accommodations, other proponents maintain that regulations should primarily combat the noise, crime, and neighborhood disruption attributed to short-term rentals and their guests. Hoteliers, meanwhile, largely support taxation schemes that subject STR hosts to the same fees as the traditional accommodation sector (Guttentag, 2015). Even once regulations are decided upon and enacted, challenges remain. Technology-based disruptive models such as Airbnb oftentimes prove difficult to regulate due to the speed at which they develop (Guttentag, 2015). Enforcement can be challenging as well, with rulebreakers raising questions about the effectiveness of new regulations (Neustaeter, 2018).

The proper level at which regulations should be enforced has not been agreed upon either. The findings from the lifecycle analysis above suggest that different types of listings generate unique concerns in different settings; for example, while jurisdictions with particularly high rates of part-time, tourist-catering listings are faced with challenges of short-term periods of intense neighborhood disruption, cities, suburbs, and rural areas with high rates of FREH and VFREH listings may face longer-term problems of housing loss. As such, localized regulatory frameworks may provide the best opportunity for individual municipalities to combat the unique challenges of their specific STR market. While the majority of regulations thus far have been enacted by cities, large commercial operators, who were shown to inflict the most harm on housing stock due to the rate at which they acquire new listings, oftentimes own properties across many jurisdictions. In such cases, municipal-level regulations may fail to curb the negative externalities of these hosts' actions, and legislation enforced by higher orders of government may prove more effective. The rapid growth of STR activity in rural areas may be best regulated by higher orders of government as well. Small jurisdictions, which have comparably less resources with which to tackle the challenges posed by STRs, may find it difficult to effectively enforce regulations. In still other cases, local forms of self-governance have proven more effective than either municipal or provincial governments at regulating Airbnb activity. Accounts of evictions of Airbnb hosts for operating illegal STRs suggest that a crackdown by landlords may be far more threatening than other forms of legislation (Guttentag, 2015).

Regardless of who imposes the regulations, this analysis has reinforced the benefits of using a two-step approach to developing effective STR policies. First, lawmakers interested in using this strategy should complete or obtain an exhaustive review of short-term rental activity within their jurisdiction in order to understand the local market composition. Second, the specific composition of the market should be analyzed using a lifecycle framework to gain a thorough understanding of how listings' behaviors change as they mature and to consequently develop targeted, proactive regulations to manage anticipated negative externalities of shifting STR markets. The information yielded by a lifecycle analysis may be particularly useful for planners and policymakers in small

jurisdictions with relatively young short-term rental markets who wish to understand how STR activity is likely to evolve. Above all, this analysis demonstrates the importance of high-quality data in understanding short-term rental markets and their effects on quality of life, neighborhood disruption, and housing stock. Without unfettered access to data detailing listings' locations, reservations, and earnings, governing bodies seeking to enact STR legislation will lack the means to develop targeted regulations and the power to effectively enforce them. Airbnb's hesitance (if not outright refusal) to share booking information with policymakers is increasingly placing pressure on local residents who are priced out of their homes by growing numbers of short-term rentals. Moving forward, governing bodies must demand accountability and cooperation from Airbnb and other homesharing platforms – Canadians cannot afford the alternative.

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