

Reducing Affordability: The Impact of Airbnb on the Vacancy Rate and Affordability of the  
Toronto Rental Market

By: Tyler Horton

7371612

Major Paper presented to the  
Department of Economics of the University of Ottawa  
In partial fulfillment of the requirements of the M.A Degree  
Supervisor: Professor Anthony Heyes  
ECO 6999

Ottawa, Ontario

December 2016

## **Table of Contents**

<b>Introduction</b>	4
<b>Literature Review</b>	
• Sharing Economy	7
• Social Costs	8
• Vacancy Rates and Rental Prices	10
• Other Rental Market Impactors	13
<b>Data</b>	14
• Methodology	
○ Airbnb	15
○ CMHC	16
○ Mapping	16
○ Limitations	17
• Estimation Strategy	18
<b>Results</b>	20
• Vacancy Rates	20
• Rental Rates	20
<b>Discussion of Results</b>	
• Impact of Airbnb on Vacancy Rates	21
• Impact of Airbnb on Rental Growth Rates	21
<b>Conclusions</b>	22
<b>Appendices</b>	
Annex A: Limitations	25

Annex B: Vacancy Rate Results Table	27
Annex C: Regression Model Table	28
Annex D: Citations	29
Annex E: Toronto Map of Airbnb Listings	32
Annex F: Site Scrape Table	33
Annex G: Table 1A and 1B	34

## **Introduction**

The sharing-economy is a market characterized by peer-to-peer-based sharing or renting of goods and services and is home to a number of companies such as Airbnb, HomeAway, Flipkey, Uber, Lyft, and Zipcar. The growth of this model has proven to be extremely disruptive to some industries including, for example, the taxi industry due to the effect of platforms such as Uber and Lyft (Crame and Krueger, 2016) and the hotel industry due to the effects of the Airbnb platform. (Zervas et al 2013). While these platforms have continued to acquire market share within their respective industries, their overall impact remains undetermined.

Secondary effects of these platforms have been a cause for concern in some industries. For example, while Airbnb has caused an impact on the hotel industry directly, speculation has arisen that it has also impacted rental housing affordability, shifting the rental housing supply curve left by removing properties from the market. This paper explores this topic further, by analyzing the impact of Airbnb on the rental housing market in the Toronto, Ontario, Canada area.

Airbnb, a privately-owned company, was established in 2008 in San Francisco, USA. Airbnb currently operates in 34,000 cities across 190 countries, maintaining over 1,500,000 listings. The appeal of Airbnb can be found in the revenue it is able to generate homeowners. An apartment which is rented for \$150 a night on Airbnb at 80% capacity can generate \$3,720 for the homeowner, a return which far exceed any average rent found in any Canadian Census Metropolitan Area (CMA) at the time of the writing of this paper. The revenues generated are significant enough that some homeowners have begun to offer discounts for stays of one week or one month, a tactic which initially seems to be at odds with the short-term rental appeal of

Airbnb but which allows homeowners to mitigate the risks of vacancy at a low cost. For example, consider the following scenario in the below table:

2 Bedroom Rental Unit Toronto Central	Oct-16
Average Rent	\$ 1,932.00
Median Rent	\$ 1,800.00
Average Rent Per Day	\$ 62.32
Average Median Rent Per Day	\$ 58.06
Average AirBNB Rental (Entire Home) / Night	\$ 150.00
Days needed to equal Average Monthly Rents	12.88
Days needed to equal Monthly Average Rent with 15% Discount	15.15
Revenue generated at 80% capacity	\$ 3,720.00
Revenue Generated at 80% Capacity with 15% discount	\$ 3,162.00
Revenue Generated Monthly Rental with 15% discount	\$ 3,952.50

Source: CMHC 2016 Rental Market Survey Data and Airbnb Toronto Dec-2016 Data tables.

Even with the discount, the homeowner needs only rent the listing for half the month to equal the average rent that is available in Toronto Central.

The revenues available to homeowners has led to an increase in Airbnb listings. As it has grown, Airbnb, like many sharing-economy firms, has faced a number of legal and regulatory challenges as it expands its business practice using a business model which often contravenes short-term rental by-laws in many jurisdictions. One of the first regulator responses to Airbnb was by the New York State Legislator, who in 2010 passed a law which emphasized the illegality of apartment buildings which serve primarily transient populations. (New York City, 2010). Since that time, a number of cities (San Francisco, San Jose, Berlin, Paris, and Portland), provinces (Quebec), and countries (Amsterdam and Spain) have imposed bans, oversight, and regulations on Airbnb.

New York has been particularly aggressive in its attempts to regulate Airbnb. In addition to its 2010 law, the city published a report by the state Attorney General in 2014 which, using data that was obtained from Airbnb under subpoena, concluded that “private short-term rentals displaced long-term housing in thousands of apartments”. (New York State Office, 2014). Researchers noted that Airbnb removed thousands of “homes and entire apartments” days prior to the data release, suggesting the Attorney General’s report might have underestimated Airbnb’s impact on the New York City rental market. (New York Times, 2016)

Regulators who are tasked with developing legislation for firms who participate in the sharing economy face a significant challenge. Unlike traditional firms, companies such as Airbnb and Uber operate without borders, have little to no “brick and mortar” presence and remain private entities, restricting the amount of data one can obtain without court orders.

The concern which has motivated this paper is the impact of Airbnb on the availability of rental housing on the markets in which it operates. Noting that supply and price are intrinsically linked, concerns have been raised regarding the effect of Airbnb on the vacancy rate and the subsequent effect this could have on rental rates and, by extension, affordability. Cities such as Vancouver and Berlin have seen intense discussion on Airbnb’s influence on the supply of affordable rental housing, a discussion which culminated in a new law passed by Berlin on May 1<sup>st</sup>, 2016 that bans Airbnb from renting apartments to tourists. (Berlin 2016). Questions regarding the impact of Airbnb on the affordability of the rental stock are particularly concerning in Canadian cities such as Vancouver, Montreal, and Toronto, which suffer from low vacancy rates, a lack of apartment rental starts, and stagnant rental apartment universe growth.

Using data obtained through the Canadian Housing and Mortgage Corporation (CMHC) and from the Airbnb website, this paper seeks to assess the impact, if any, that Airbnb has on the vacancy rates of the Toronto apartment rental market. As well, using time-series data in Toronto over a five-year period and employing a fixed-effects model, this paper evaluates whether Airbnb has had an effect on the rental prices of the Toronto market.

## **Literature Review**

### *Airbnb and the Sharing Economy*

The sharing economy is a disruptive economic system characterized by the sharing of services, capital (through bartering or sale), and physical spaces by individuals to other individuals. A key result of this system is that the trading of goods bypasses the traditional business and regulatory framework that is used for the transactions of good and services. The business models of many of these firms rely on the use of technology, typically an app or an online delivery platform. For many companies, the app connects individuals seeking services (e.g., taxi ride, a place to stay, someone to babysit) with individuals who offer these services. Individuals pay for services through credit cards, simplifying the transaction, while the individuals offering services receive payment from the “middle-company” such as Airbnb, who profits by taking a percentage of the payment.

The system is designed to reduce and/or minimize asymmetric information and transaction costs. As an example, in the case of taxi cabs, research has found that high search costs can prevent consumers from searching entirely. As well, in cases where consumers do call for a taxi, the inability to track when a taxi-cab will arrive, the ability to hail another taxi-cab, and a taxi driver’s inability to contact customers, which can cause drivers to abandon their fare, can create

significant costs. These costs are reduced in the modern sharing-economy model. (Rogers, 2015)  
This ability to instantly reduce costs for all parties can create an immediate disruption of markets where high search costs exist.

This effect is displayed through Airbnb`s impact on the hotel industry. Airbnb`s entry into the short-term accommodation sector, a sector dominated by hotels, motels, hostels, and bed-and-breakfast firms, appears to have impacted regional accommodation business revenues significantly. Analysis of Airbnb`s impact on the hotel industry in Austin, Texas, found that Airbnb has a causal impact on hotel revenue, being responsible for a drop 8-10% in bookings, an effect which fell predominantly on lower-priced hotels who do not cater to business travelers. (Zervas and Byers, 2016).

While the Zervas and Byers analysis suggested that Airbnb is competing with hotels, overall hotel revenues do not appear to have been negatively affected. In 2015, Airbnb had 550,000 U.S. listings in the United States (Airbnb 2016), yet STR Inc., a data collection and forecasting company for hotels across the world, reported that revenue per available room increased 6.3% in 2015, and industry occupancy increased 1.7%. (Hotel News Now, 2016). One possible explanation for this is that Airbnb is targeting different travelers, those who want an “entire house” experience, rather than business travelers who depend on convenience. This explanation could be responsible for the popularity of the entire house listings on Airbnb which in October 2015, made up 64% of Airbnb`s listings within the Toronto dataset used for this paper.

### *Social Costs*

The social costs (or external costs) of these services is a subject which has piqued the interest of regulators across the world. In the case of Uber, which has received substantially more research

and discussion than other companies, a number of social costs have been raised against it such as its lack of adherence to local regulations and laws, monopolistic behavior, use of non-commercially insured drivers, and the perceived overly low pay for drivers. The key commonality between these concerns is that, taken to their conclusion, they threaten consumer welfare. (Brishen 2015).

A variety of responses to these concerns have been found among regulators. Countries such as Spain<sup>1</sup>, and cities such as Portland, Nevada, San Antonio, and Brussels have banned Uber completely. Other cities, such as Moscow and Madrid have produced quasi-regulatory solutions in allowing the company to operate through existing taxi-drivers and taxi-regulatory frameworks. Some cities, such as Ottawa, have allowed Uber to operate, though they must pay a licensing fee to the city as well as a per-trip cost. (City of Ottawa, 2016). These responses attempt to minimize social costs while maximizing the increased in consumer welfare offered by these companies.

Similar to the concerns expressed against other sharing-economy firms, negative social-costs have been associated with Airbnb. In particular, Airbnb has been accused of reducing the available housing stock and by extension, the availability of affordable housing. A number of cities are in the process of investigating and drafting legislation that will impact Airbnb including: New York, San Francisco, Oakland, Los Angeles and Toronto. A report by the New York State Attorney General analyzed listings between 2010 and 2014 and revealed that in addition to the growth of Airbnb in New York City, a large share of the homeowners on Airbnb were commercial in nature and not simply individuals renting out an extra room. As well, the

---

<sup>1</sup> Will Uber remains banned in Spain, as of March 31<sup>st</sup>, 2016, licensed, professional drivers will be able to drive through UberX in Madrid. This is a similar approach to the one UBER took in Moscow where only registered tax drivers are allowed to drive for Uber.

analysis suggested that these private short-term rentals were displacing the availability of long-term housing in the city. (New York State Office, 2014). More recently, a study by the Canadian Centre for Policy Alternatives analyzed the impact of Airbnb on the Toronto real-estate market. Similar to the New York report, this study demonstrated that commercial users represented a disproportionate percentage of Airbnb rentals and that these listings are concentrated in high-density, tourist areas. (CCPA 2016).

### *Vacancy Rates and Rental Prices*

It is expected that the primary mechanism by which Airbnb would impact rental prices is through reducing supply. A theory of transmission is that as supply drops, owners do not need to invest as much into searching for a tenant and therefore there exists an upward pressure on prices as many tenants battle for the remaining housing units.

This relationship of the rental rate adjustment mechanism through vacancy rates has received substantive economic analysis. For example, the seminal paper “The Structure of the Housing Market” (Blank and Winnick 1953), provided a theoretical framework through which to analyze the housing market including housing sub-markets such as unit characteristics and the effect of substitutes. The paper also theorized that the market would respond traditionally to supply and demand shocks, such that increases in demand without adequate supply should produce rent increases. Academic research has attempted to analyze the applicability of this framework. For example, Smith (1969) demonstrated the effect using Canadian city level data. However, a number of empirical studies (Eubank and Sirman 1979, Leeuw and Ekanem 1971, and Fair 1972) which followed suggested that the adjustment mechanism could be affected more strongly by factors not related to supply and demand.

The theoretical framework received significant advancement in the paper “The Price-Adjustment Process for Rental Housing and the Natural Vacancy Rate” (Rosen and Smith, 1984), which confirmed the relationship between supply, demand, and rental prices through the use of a natural vacancy rate. The results, which used data from 16 American cities, confirmed that variations in the vacancy rate, particularly as it deviates significantly from the natural vacancy rate, can have significant impacts on rental prices.

While rental housing, like other markets, seeks to establish an equilibrium, it does so through the “natural vacancy rate” or NVR. The NVR reflects the complexities of the housing market where buyers and sellers have search costs which can cause changes in expectations and prices depending on the bargaining process. As a result, price-setters (homeowners) will set a price which is determined through a combination of expected return and expected sales time. Higher vacancy rates that exist in the market will increase sales time, as consumers have more options, and will thus reduce the seller’s sale expectations. This has the effect of reducing prices as homeowners try to speed up the sale process. Consequently, when vacancy rates are low, the sales time is shorter due to a lack of options available, and sellers can charge higher prices. (Wheaton, 1990)

A number of market factors can impact NVR, though most can be classified under economic activity (job churn, decreased or increasing wages) and regulatory changes (land zoning restrictions, green belts). A potentially substantial factor can also be found in technological change. Technological change allows us to establish a predictive theory: if NVR is dependent upon search costs, reducing the search costs for buyers and sellers should reduce the natural vacancy rate. This question was the focus of a study on the Seattle rental housing market (Hagen and Hansen, 2010). The study used rental market data in the Seattle metropolitan area from the

years of 1989 to 2005. Using a coefficient which tracked the impact of the internet ( $n = 0$  for the period prior to 1994), Hagen and Hansen found that the internet had a significant impact on Seattle's natural vacancy rate, reducing it from 5.64% in 1994 to 4.25% in 2005. For comparison, between 1989 and 1994, the vacancy rate was stable at around 5.64%.

Hagen and Hansen, whose paper was published in 2010, estimated that the reduction in search costs facilitated by the internet has already peaked. The time series data used by Hagen and Hansen covers the birth and operation of some of the more prominent online marketplaces for rental housing including Craigslist (Est. 2000), Majordomo (Est. 1992), Usenet (Est. 1980, but used extensively in the early internet days), and the WELL (Est. 1985). Hagen and Hansen's data set, which ended in 2005, does not include a number of modern innovations including the smartphone revolution and the rise of mobile apps, which started with the release of the iPhone in 2007, and the development of marketplaces such as Kijiji, or market-based information aggregators such as Padmapper.com (Est. 2012). Padmapper, an online website which also has an app, takes rental listings from a variety of online market places and displays them on a map, with a variety of filters that an individual can use to sort with. Padmapper's popularity has skyrocketed due to its ease of use, reducing search costs and facilitating better matching between individuals and housing units.

The aforementioned businesses reduce search costs and information asymmetry. While their impact on the rental market is not yet known, they are likely accelerating the decline of the NVR in many cities. A compounding effect can be found in the new platforms which remove supply from the market entirely. Platforms such as Airbnb, HomeAway, Flipkey, 9flats, and VRBO all provide an online-marketplace through which homeowners can rent their units to travelers in a hotel-like setting.

As mentioned, a number of cities have focused on Airbnb and its assumed impact on reducing the supply of rental housing. The future impact of Airbnb and similar programs on distorting the natural vacancy rates of cities and by extension, raising rental prices, will likely create significant regulatory and policy concerns in the future. The subsequent sections of this paper seek to provide some guidance to these future concerns through an examination of Airbnb and the Toronto rental market.

### *Other Rental Market Impactors*

The Toronto vacancy rate has been low for a number of decades. This persistent vacancy rate in purpose-built rental is due to a number of factors, most recently being likely attributed to population growth and the shrinking share of purpose-built rental housing in the annual Toronto housing starts. For example, Table 1A shows that over the last 25 years, condominiums and freehold houses have increased their overall share of the housing starts in the Toronto market. As well, Table 1B shows that the purpose-built rental starts for the Toronto CMA have remained consistently low, only recently trending upwards regardless of factors such as population growth and low-vacancy rates. In addition to these supply pressures, other factors such as the inability to obtain favorable financing for rental housing (Black, 2012), and the high carrying costs of rental housing can impede the expansion of rental housing. As well, tax laws (such as Government Sales Tax penalties where owners cannot claim tax credits on goods and services related to rental housing and a low Capital Cost Allowance rate), municipal regulations including issues laws such as inclusionary zoning, development charges, and property taxes can dissuade developers from building apartment buildings which must be held and rented to recoup costs. This is in comparison to condominiums which can be sold to buyers quickly and do not need to be held. These factors contribute overwhelmingly to the supply issue that has plagued Toronto for a

number of decades. Therefore, while it is possible for us to analyze later on that in the absence of Airbnb, vacancy rates should rise, it is not possible for us to say that due to Airbnb, vacancy rates have been suppressed.

In addition to the aforementioned factors, another issue that has been raised is the relationship between housing prices and rental rates. While logically assumed, the relationship can be nuanced and it is not clear whether housing price increases in one market (for example, free-standing home units) can influence rental prices in another market substantially (purpose-built rental condominiums).

A major problem in establishing this association is that persistent low-interest rate environment could result in a perceived lack of rental-growth even when housing prices are increasing as the low-interest rates would reduce carrying costs for homeowners, allowing them to offer lower rents. Supporting this, research has suggested that increases in housing prices are not immediately reflected in rental rates but rather, have a lag which is present following a period of high growth. (Gallin 2004) This could be the result of low-interest rates facilitating increases in housing prices with the subsequent decreases in housing prices increasing carrying costs, necessitating higher rents.

## **DATA**

### ***Methodology***

Analyzing the impact of Airbnb on affordable housing is difficult for a number of reasons. One problem that has been persistent is the lack of public data on Airbnb, which as a private company, is not required to share data publicly. While this limits the type of research that can be conducted, the listings on its site are public and with thousands of listings, researchers such as

InsideAirbnb.com have started to use PHP computer code to analyze and read the data of the website. The code captures data from the Airbnb website and populates it into a spreadsheet, providing a “snap-shot” of Airbnb’s prevalence in the marketplace using a point in time count. (See Annex E) Analysis will focus on using this data with CMHC’s rental market housing data to access the relationship between vacancy rates and rental prices in the Toronto area as well as Airbnb’s impact on those vacancy rates. This data provides us with a summary of Airbnb’s listings on October 1, 2015 for the Greater Toronto Area.

### *Airbnb Dataset*

Airbnb does not publicly release information regarding its economic activities except in exceptional cases such as the court-ordered information reveal that occurred in New York and San Francisco. The Toronto dataset is a “site-scrape” of Airbnb that occurred in October 2016. A site scrape uses computer code (PHP) to capture all the listings of Airbnb within a city and summarize this information in a spreadsheet. (See Annex E)

A number of controls were used to prepare the Toronto Airbnb dataset and create a database of “impact listings”. The first was to select only those units which were renting an entire residence. While Airbnb allows an individual to rent a range of accommodations including a floor, couch, room, condo, apartment, and a house it is reasonably assumed that listings for entire residences would be more likely to impact the rental market. Controlling for entire residences provides us with a dataset of 4,270 unique listings. To further refine the dataset and produce impactful listings, we only included units that were available for more than 80% of the year. As well, we only included units which had received a review within the previous six months.

This created a dataset of 2,690 listings which we have termed “Scenario B”. A second dataset, “Scenario A” was produced by controlling for listings which were part of a portfolio of listings held by one owner (commercial listings). This second scenario produced a dataset of 833 listings,

### *The Canadian Mortgage and Housing Corporation (CMHC)*

CMHC collects rental market data which it publishes twice a year in its Rental Market Outlook. CMHC also maintains the Housing Market Information Portal which allows access to all publicly available CMHC data. The portal allows you to view the data in a map format organized by Rental Market Area. The rental market data is organized by residential bedroom type (E.g., a condo with 1 bedroom, 2 bedrooms, or 3 bedrooms) and building type (apartment, home, townhouse, and condo). The data includes vacancy rates, median and average rent, availability rates as well as the total available rental universe.<sup>2</sup>

CMHC data provided vacancy rates by building type and geographic location (Rental Market Area). In addition to the vacancy rate percentages, CMHC data also provides the nominal number of vacant buildings as well as the total building universe. The data used for Toronto has a total of 24 geographic locations, covering the Greater Toronto Area (GTA).

### *Mapping*

Using zeemap.com software, Airbnb listings were mapped according to the longitudinal and latitudinal data that was provided through the site scrape for each listing. (See Annex D) The number of Airbnb listings found within each rental market area was then counted. (See Table 1) The site scrape was performed in October 2015 and was done to align closely with the data

---

<sup>2</sup> A universe describes the total number of a specific dwelling found within a specific geographical area.

collection month of the coinciding Rental Market Survey which is conducted by CMHC in the spring and fall. This analysis resulted in an estimated vacancy rate impact of Airbnb on the Toronto rental market in October 2015.

*Limitations:*

While research has indicated that the vacancy rate can be a significant indicator of rental price growth across the sector, it is one of many variables that can affect the individual price setting of a rental unit. The model presented within this analysis is limited to describing the association between vacancy rates and rental rates with any conclusions beyond this being susceptible to omitted variable bias. Rental rates are a function of a number of variables including: location based variables (zoning, proximity to high-value or high-demand institutions, avoidance of certain areas for a variety of reasons (pollution, crime, perception), land availability, and general neighborhood demand), costing variables (permit costs, land costs, development charges), proximity of substitutes (condominiums, townhomes, detached homes), building characteristics (age of the building, type of building (luxury vs lower end, condo vs apartment), personal preference of the tenants (size of family, income level, size of unit desire, preference for a certain type of living) and economic variables (unemployment rate, real-income, inflation rate, building starts and completions, and vacancy rate). Therefore, while the results indicate a negative association between vacancy rates and the rental price growth of Toronto, results which are consistent with previous literature, the magnitude of this association could vary significantly when other factors are considered.

Airbnb data was not available in the form required to segment the rentals by unit size or age.

While rental price data and vacancy rates were available through CMHC by unit size and age of

building, the Airbnb data required the use of aggregate regional rental price data. CMHC data shows that, while the majority of the universe is under three bedrooms, vacancy rate and rental rates vary significantly by unit type, particularly as the units become larger (3 bedroom+).

While we assume that if Airbnb was banned, all listed properties would return to the rental market, this assumption could be unrealistically restrictive. It is expected that some owners who are renting multiple Airbnb properties purchased properties specifically to profit from the Airbnb model. It is possible that should Airbnb be banned these owners would sell the properties they own rather than rent them out and therefore the effect on the rental rate would be smaller than what is found here. As well, individuals on Airbnb could be renting out their primary residence and therefore if Airbnb was banned this unit would not be returned to the market as a surplus unit. A major effect that could determine the percentage of homes which return to the market is the number of owners who are in a position to carry the costs of the additional property with lower returns. In addition, investment properties that are not multi-unit residential buildings and second mortgages are not eligible for mortgage insurance, therefore many homeowners have invested at least 20% of the sale price of the property they use in Airbnb. It is possible that faced with smaller returns if Airbnb was banned, these homeowners would wish to liquidate their positions in order to invest in other products with potentially higher returns than rental housing.

Airbnb is one of many home-sharing or short-term rental sites that are currently active. Other examples which have listings for the Toronto, Ontario, Canada market include but are not limited to: couchsurfing.com, kijiji.com, flipkey.com, tripping.com, vrbo.com, homeaway.com, and perfectplaces.com. This analysis was restricted to Airbnb and did not consider the populations of other websites. While there is undoubtedly overlap in listings among the websites, it is possible

that the number of short-term rentals in the Toronto area, and the impact of this market on vacancy rates and rental rates, is larger than what is displayed and estimated within this paper.

### ***Estimation Strategy***

We use cross-section data on 24 CMHC rental regions and their respective rental rates, vacancy rates, and rental starts over a period of 2011-2015 to analyze the correlation between rental rates and vacancy rates in the Toronto, Ontario, Canada market. To analyze the impact of the vacancy rate on rental rates, a fixed-effects model was employed, allowing us to consider regional and yearly effects, and expressed as follows:

$$\ln Y_i = a + B_1 X_{1i} + B_2 X_z + B_3 X_w + B_4 X_{4i} + e$$

where  $Y_i$  is the log of the current rental rate for zone  $i$  over a period of time<sup>3</sup>,  $X_1$  is the current vacancy rate for Zone  $i$  over a period of time and  $X_z$  is a group of fixed effect year variables,  $X_w$  is a group of fixed-effect location variables and  $X_4$  is the number of rental starts for a given year in a given zone.

A fixed-effects approach is useful to alleviate omitted variable bias that can occur in cross-sectional data. The Toronto dataset that was used contains data points of rental rates and vacancy rates for 2 bedroom units in rental zones throughout Toronto over a period of 5 years. Due to the difficulty in obtaining yearly data of variables which could impact rental rates and supply for these areas (e.g., population growth, wage growth, employment rates, land available and zoning restrictions, etc), a fixed effects approach was used to reduce the risk of omitted variable bias.

---

<sup>3</sup> A log was used as rental rates are positively skewed over time

The use of a fixed-effects approach allows us to control for the average differences across these regions such as differences in aggregate trends such as population growth and unemployment rates, to analyze within-group, inner-city, actions.

A significant barrier to the use of a fixed-effects model is a lack of variation within the dataset and the inability to use time-invariant variables within a fixed effects model. This analysis is able to avoid this barrier due to the large sample set (24 zones) which provides significant variation of vacancy rate and rental rates.

This provided us with insight into the impact that Airbnb could have on the Toronto market rental rate. To estimate the impact on vacancy rates it was assumed that all units which formed Scenario A and B would return to the rental market if Airbnb was banned. Airbnb units were mapped and tallied within the Toronto market according to the CMHC rental zones using mapping software. (See ANNEX A). Units were assumed to return to the market entirely and thus vacancy rates were calculated by adding the current available units within a market to the Airbnb units that would be returned.

## **Results**

### *Vacancy Rates*

As is displayed in Table 1, if Airbnb rentals were returned to the rental market, it would have an immediate positive impact vacancy rates in every tested district in Toronto with a range of 0.2% (Etobicoke North) to 3.98% (Toronto Central) in Scenario A and 0.001% (Etobicoke North) to 1.46% (Toronto Central) for the more restrictive Scenario B. In three regions, Toronto West, Toronto Central, and Toronto East, the number of Airbnb listings found within Sample A was higher than the number of units that were currently available for rent in those respective

jurisdictions, suggesting that in the absence of Airbnb, the number of available units would more than double in some areas.

### *Rental Rate*

As displayed in Table 2 the model finds support for a negative association between vacancy rates and rental rates in the Toronto, Ontario, Canada market. While this result is consistent with the previous literature on vacancy rates and rental rates, it is limited significantly by the aforementioned omitted variable bias which is persistent in housing analysis. While this result is consistent with the thoughts that a rightward shift of the supply curve of rental housing would result in decrease rental rates and similarly and by extension, a shift left (by shrinking supply, as Airbnb has done) would cause an increase in the cost of rental housing, the magnitude of these shifts is dependent heavily on a variety of factors as was discussed previously.

## **Discussion of Results**

### *Vacancy Rates*

The largest Airbnb impact was found in Toronto Central, East, and West, which though only representing 22% of Toronto's population, are located close to the primary tourist and business sectors of the city. The impact outside of these central areas was underwhelming with changes of under 0.5% being common. Thus, it appears that Airbnb is much more impactful in high-density, high-demand neighborhoods suggesting that that Airbnb is acting as a substitute for short-term rental locations such as hotels and hostels and that its impact on the overall rental market is a secondary effect. Concerned regulators should therefore consider targeted zoning legislation that deals with specific geographic regions.

Sample A, which consisted of owners who posted more than one Airbnb listing, had an impact that was significantly lower than Sample B, which consisted of individuals who only had a single listing. This suggests that contrary to some of the reports produced by New York and San Francisco, the impact of Airbnb is not simply from investors who are purchasing property but could be significantly driven by individuals who, for a variety of reasons, decide to rent out their home or a single investment property through Airbnb. Further research could compare Airbnb listings over time in order to develop a longitudinal analysis to assess their longevity. This would provide regulators with information on the nature of Airbnb rentals and would provide insight into the persistence of listings.

### *Rental Rate*

The results of the model support the literature on the negative association of rental rates and vacancy rates, suggesting that an increase in vacancy rates in Toronto would correspond with a percentage decrease in the average rental rate charged. While the model used in this analysis overlooks several relevant variables, it nevertheless reveals cause for concern. While this analysis did not seek to quantify Toronto's natural vacancy rate, it suggests that Airbnb, launched in 2008, could be having a persistent effect on the Toronto rental market. While analysis could have difficulty assessing this long-term cumulative impact of Airbnb on rental rates, and by extension the impact of Airbnb on affordability, it is likely significant enough to warrant further research. Furthermore, because this model used a very restricted sample of the all Airbnb listings, which itself is just one of many such platforms, the actual impact of short-term listings could be much higher.

## Conclusion

Airbnb has a significant impact on the vacancy rates in several regions of Toronto, which has contributed to higher prices for rental units, negatively impacting housing affordability. While the platform reduces search costs for homeowners who are revenue seeking or who wish to minimize the search costs by generating revenue between long-term tenants and provides a service for travelers, offering a unique and often less expensive alternative to hotels, the social impact of its platform on rental-housing affordability is a significant concern. This concern is particularly pertinent given the stagnant growth of the rental-housing universe and rising home prices in key Canadian markets.

The impact of Airbnb will likely increase as the market continues to mature. Complementary firms have begun to enter the space, providing services such as dynamic pricing and rental management to homeowners who wish to maximize their Airbnb profit. For example, San-Francisco based Beyond Pricing has begun selling a service to Airbnb renters which allow them to implement dynamic pricing, pricing models used by hotels and airlines to increase price elasticity, by providing them with information which can lead them to increase prices when demand is high and decrease them when it is low. Other complimentary firms can be seen in the evolution of rental management companies who has begun to expand service offerings to Airbnb owners. As an example, Host Service Group in Toronto offers a suite of services including listing management, client-facing support, and direct deposit payments for Airbnb owners in exchange for a 20% commission.

Going forward, further research should attempt to understand the intentions of Airbnb listers and their motivations for listing. It is possible that homeowners have a multitude of reasons for

listing on Airbnb other than pure profit-maximization. Some may seek to use Airbnb to reduce the search costs of finding suitable long-term tenants by generating revenue during the searching period. Further, individuals could use Airbnb to subsidize travelling, generating revenue when they are not using the home.

Regulators who attempt to police Airbnb will face significant challenges in the future. Airbnb is not easy to regulate, listings, while publicly available, do not necessarily constitute a by-law violation and the costs of verifying that these listings resulted in violations is currently significant. Furthermore, Airbnb has demonstrated that it not afraid of litigation, having sued both the City of San Francisco, Santa Monica, and New York over regulatory legislation that would increase its costs or disrupt its business model. One alternative that could be explored is to allow Airbnb through the implementation of a registration scheme, allowing for the collection of occupancy information and taxes.

The long-run equilibrium of this market is likely to be achieved in the future where homeowners are indifferent between listing a home on Airbnb or on the rental market. It remains to be seen what the impact on the rental market will be in terms of availability and affordability before such an equilibrium occurs and whether this equilibrium will be the result of rental price increases or Airbnb price decreases.

## **Annex A**

### *Limitations:*

A number of factors will contribute to variability in the growth rate of rents. Some of these include, but are not limited to:

- Zoning restrictions
- Access to land
- Economic variables (e.g., population growth, income levels and growth, unemployment, housing prices, etc.)
- Infrastructure costs which will be passed down due to development charges
- Consumer preferences regarding geographic considerations such as proximities to local resources (parks, schools, waterways, forested areas etc.) and negative externalities (highways, industrial areas, crime-rates, universities, etc.)
- Developer costs associated with NIMBYism (Not in my backyard) and the length of the application approval process
- Competing products (condominiums, office space, detached homes)
- Size, audience, and the style of the housing being built (mini vs normal, modern vs refurbished, bachelor vs a 4-bedroom family unit)
- Availability of parking

### Age of the buildings

The rental price of a unit related closely to its age, this can produce an effect of rental units where a luxury unit being built today will become an affordable unit in 10 years. This process,

which has been termed “Filtering”, can have a significant impact on rents and should be considered in any analysis on rental rates. It was not possible to analyze the age of the buildings of the Airbnb properties and therefore it was not possible to stratify the properties by age grouping.

### Self-Assessments

The data included a building type identifier. This identifier is self-selected by the creators of the listing, allowing for the possibility that some buildings selected apartment instead of a more appropriate selection (e.g., condominium) and vice versa. It is possible that some landlords would select condominiums instead of apartment to add a level of “stature” to their listing. The data set used in this analysis did not include condominiums and therefore might be smaller than the actual apartment data set.

### Impact Assessment

Due to the nature of the Airbnb data, it is not possible to conduct a stratified assessment of Airbnb’s impact on the rental market in Toronto to see if Airbnb is disproportionately affecting affordable, luxury, median, or low-end rentals. This would be an important analysis in future research and in future policy development.

**Annex B**  
Table 1

Region	Year	Apartments Universe Total	Vacancy Rate	Number of Available Unit in universe No	Sample A	Sample B	Sample A Percent of Universe	Sample B Percent of Universe	Sample A New Vacancy rate	Sample B New Vacancy Rate	Sample A Change	Sample B Change	Sample A Percent Change	Sample B Percent Change
Toronto Central	2015	29462	0.017	501	1173	430	3.98%	1.46%	5.68%	3.16%	3.98%	1.46%	234.20%	85.85%
Toronto East	2015	6668	0.012	80	188	52	2.82%	0.78%	4.02%	1.98%	2.82%	0.78%	234.95%	64.99%
Toronto North	2015	29744	0.018	535	112	19	0.38%	0.06%	2.18%	1.86%	0.38%	0.06%	20.92%	3.55%
Toronto West	2015	22269	0.019	423	833	184	3.74%	0.83%	5.64%	2.73%	3.74%	0.83%	196.88%	43.49%
Etobicoke South	2015	10291	0.03	309	76	23	0.74%	0.22%	3.74%	3.22%	0.74%	0.22%	24.62%	7.45%
Etobicoke Central	2015	15988	0.015	240	20	5	0.13%	0.03%	1.63%	1.53%	0.13%	0.03%	8.34%	2.08%
Etobicoke North	2015	5243	0.008	42	1	0	0.02%	0.00%	0.82%	0.80%	0.02%	0.00%	2.38%	0.00%
York	2015	17286	0.019	328	38	12	0.22%	0.07%	2.12%	1.97%	0.22%	0.07%	11.57%	3.65%
East York	2015	18579	0.019	353	39	13	0.21%	0.07%	2.11%	1.97%	0.21%	0.07%	11.05%	3.68%
Scarborough Central	2015	17471	0.013	227	21	10	0.12%	0.06%	1.42%	1.36%	0.12%	0.06%	9.25%	4.40%
Scarborough North	2015	6977	0.019	133	10	1	0.14%	0.01%	2.04%	1.91%	0.14%	0.01%	7.54%	0.75%
Scarborough East	2015	9943	0.009	89	12	2	0.12%	0.02%	1.02%	0.92%	0.12%	0.02%	13.41%	2.23%
North York Southeast	2015	16911	0.015	254	13	4	0.08%	0.02%	1.58%	1.52%	0.08%	0.02%	5.12%	1.58%
North York Northeast	2015	11637	0.016	186	82	49	0.70%	0.42%	2.30%	2.02%	0.70%	0.42%	44.04%	26.32%
North York Southwest	2015	9245	0.014	129	9	2	0.10%	0.02%	1.50%	1.42%	0.10%	0.02%	6.95%	1.55%
North York N Central	2015	12466	0.012	150	53	23	0.43%	0.18%	1.63%	1.38%	0.43%	0.18%	35.43%	15.38%
North York Northwest	2015	17107	0.012	205	10	4	0.06%	0.02%	1.26%	1.22%	0.06%	0.02%	4.87%	1.95%

## Annex C

Table 2: Regression Model Table: Vacancy Rate, Starts, Year and Location Variables

Explanatory Variables	(i)		(ii)		(iii)		(iv)	
Vacancy Rate for Zone i in year i	-0.0476	(0.000)***	-0.0555	(0.000)***	-0.0616	(0.000)***	-0.0272	(0.002)***
Number of starts for Zone i in Year i			0.026	(0.000)***	0.0304	(0.000)***	0.0138	(0.003)***
Constant	7.067	(0.000)***	6.939	(0.000)***	6.932	(0.000)***	6.9385	(0.000)***
Year 2011					-0.7378	(0.002)***	-0.0642	(0.000)***
Year 2012					-0.0284	(0.233)	-0.0347	(0.012)*
Year 2013					0.0111	(0.623)	0.0041	(0.748)
Year 2014					0.0405	(0.073)*	0.0272	(0.033)*
TorontoCentral							0.1841	(0.000)***
TorontoEast							-0.0297	(0.191)
TorontoNorth							0.1838	(0.000)***
TorontoWest							-0.1112	(0.653)
EtobicokeSouth							-0.9831	(0.001)***
EtobicokeCentral							0.1326	(0.000)
EtobicokeNorth							0.0071	(0.848)***
York							0.1821	(0.516)
EastYork							0.0077	(0.802)
ScarboroughCentral							-0.0750	(0.001)***
ScarboroughNorth							0.0373	(0.225)
ScarboroughEast							-0.3151	(0.202)
NorthYorkSouthEast							0.0340	(0.164)
NorthYorkNorthEast							0.1688	(0.000)***
NorthYorkCentral							-0.0123	(0.648)
NorthYorkSouthWest							0.0853	(0.000)
NorthYorkNorthWest							-0.0970	(0.001)***
MississaugaSouth							-0.0427	(0.400)
MississaugaNortheast							0.1202	(0.000)***
MississaugaNorthwest							0.0900	(0.000)***
BramptonWest							-0.0106	(0.692)
BramptonEast							0.1333	(0.000)***
Oakville							0.1099	(0.000)***
RichmondHill							0.0714	(0.004)**

## Annex D

### Citations

Airdna, (2015) “2015 in Review, --Airbnb Data for the USA”. Retrieved from:

<http://blog.airdna.co/2015-in-review-Airbnb-data-for-the-usa/>

Berlin, (2016) “Non-Destruction Prohibition Ordinance”. Retrieved from:

<https://service.berlin.de/dienstleistung/326217/> translated through Google Translate.

Blank, D.M., Winnick. (1953) “The Structure of the Housing Market”. Quarterly Journal of Economics, 67, (2),181-208.

Black, Jill. (2012) “The Financing & Economics of Affordable Housing Development: Incentives and Disincentives to Private Sector Participation”. Cities Centre, University of Toronto. Research Paper 224, vi, 50 pp. Retrieved from: <http://neighbourhoodchange.ca/wp-content/uploads/2012/11/Black-2012-Affd-Housing-Research-Paper-224.pdf>

Certify, (2016) “Certify SpendSmart Report Q3 2016: Ride Hailing Rides On”. Retrieved from <https://www.certify.com/2016-10-20-Certify-SpendSmart-Report-Q3-2016-Ride-Hailing-Rides-On>

CMHC, (2016) “2016 Rental Market Survey Data and Airbnb Toronto Dec-2016 Data Tables”

City of Ottawa (2016) “Vote Records”. Retrieved from:

<http://app05.ottawa.ca/sirepub/agdocs.aspx?doctype=minutes&itemid=346284>

Cramer, Judd & Kurger, B, Alan (2016) “Disruptive Change in the Taxi Business: The Case of Uber”. NBER Working Paper, No: 22083, Retrieved from:

<http://dataspace.princeton.edu/jspui/bitstream/88435/dsp01v692t860d/3/595.pdf>

Eubank and Sirmans (1979) “The Price Adjustment Mechanism for Rental Housing in the United States”, The Quarterly Journal of Economics, 93, 1, Retrieved from:

<http://www.jstor.org.proxy.bib.uottawa.ca/stable/pdf/1882606.pdf>

Fair, (1972) “Disequilibrium in housing Models” Journal of Finance. Vol. 17, 2. Retrieved from:

<https://fairmodel.econ.yale.edu/rayfair/pdf/1972b200.pdf>

Gallin Joshua, (2004) “The Long-Run Relationship between House Prices and Rents”, Finance and Economics Discussion Series. Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C. Retrieved from:

<https://www.federalreserve.gov/pubs/feds/2004/200450/200450pap.pdf>

Hotel News Now (2016) “STR: US Results for year-end 2015, Q4 2015”. Retrieved from:

<http://www.hotelnewsnow.com/Articles/29489/STR-US-results-for-year-end-2015-Q4-2015>

Leeuw and Ekanem (1971) "The Supply of Rental Housing". The American Economic Review. Vol 61, No5. Retrieved from: <http://www.jstor.org.proxy.bib.uottawa.ca/stable/pdf/1813143.pdf>

New York City (2016) "New York State Multiple Dwelling Law". Retrieved from: [http://tenant.net/Other\\_Laws/MDL/mdl.html](http://tenant.net/Other_Laws/MDL/mdl.html)

New York State Office (2014) "Airbnb in the City". Office of the New York State Attorney General, Eric. T. Schneiderman. Retrieved from: <https://www.ag.ny.gov/pdfs/Airbnb%20report.pdf>

New York Times; Bromwich, Jonah (2016) "Airbnb Purged New York Listings to Create Rosier Portrait, Report Says." Retrieved from: [http://www.nytimes.com/2016/02/12/business/Airbnb-purged-new-york-listings-to-create-a-rosier-portrait-report-says.html?\\_r=1](http://www.nytimes.com/2016/02/12/business/Airbnb-purged-new-york-listings-to-create-a-rosier-portrait-report-says.html?_r=1)

New York Times, B, Alderman, Liz. (2016) "Uber's French Resistance". Retrieved from: <http://www.nytimes.com/2015/06/07/magazine/ubers-french-resistance.html>

Ottawa Citizen (2016) "Uber is finally Street Legal in Ottawa" retrieved from: <http://ottawacitizen.com/news/local-news/uber-is-finally-street-legal-in-ottawa>

PWC, (2013) "The Sharing Economy – sizing the revenue opportunity". Retrieved from <http://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/the-sharing-economy-sizing-the-revenue-opportunity.html>

Quigley, Rosenthal (2006) "The effects of Land Use Regulation on the Price of Housing: What do we Know? What can we learn?". Cityscape: A Journal of Policy Development and Research, 8,1. Retrieved from: <http://urbanpolicy.berkeley.edu/pdf/QR2005.pdf>

Rogers, Brishen (2015) "The Social Costs of Uber" Temple University, Beasley School of Law. Legal Studies Research Paper Series, Research Paper No. 2015-28

Rosen and Smith, (1983) "The Price-Adjustment Process for Rental Housing and the Natural Vacancy rate". The American Economic Review, 73. 4. 1983. Pp.779-786. Retrieved from: <https://www-jstor-org.proxy.bib.uottawa.ca/stable/pdf/1816576.pdf>

Smith L.B., (1969) A Model of the Canadian Housing and Mortgage Markets, Journal of Political Economic, LXXVII, 795-816

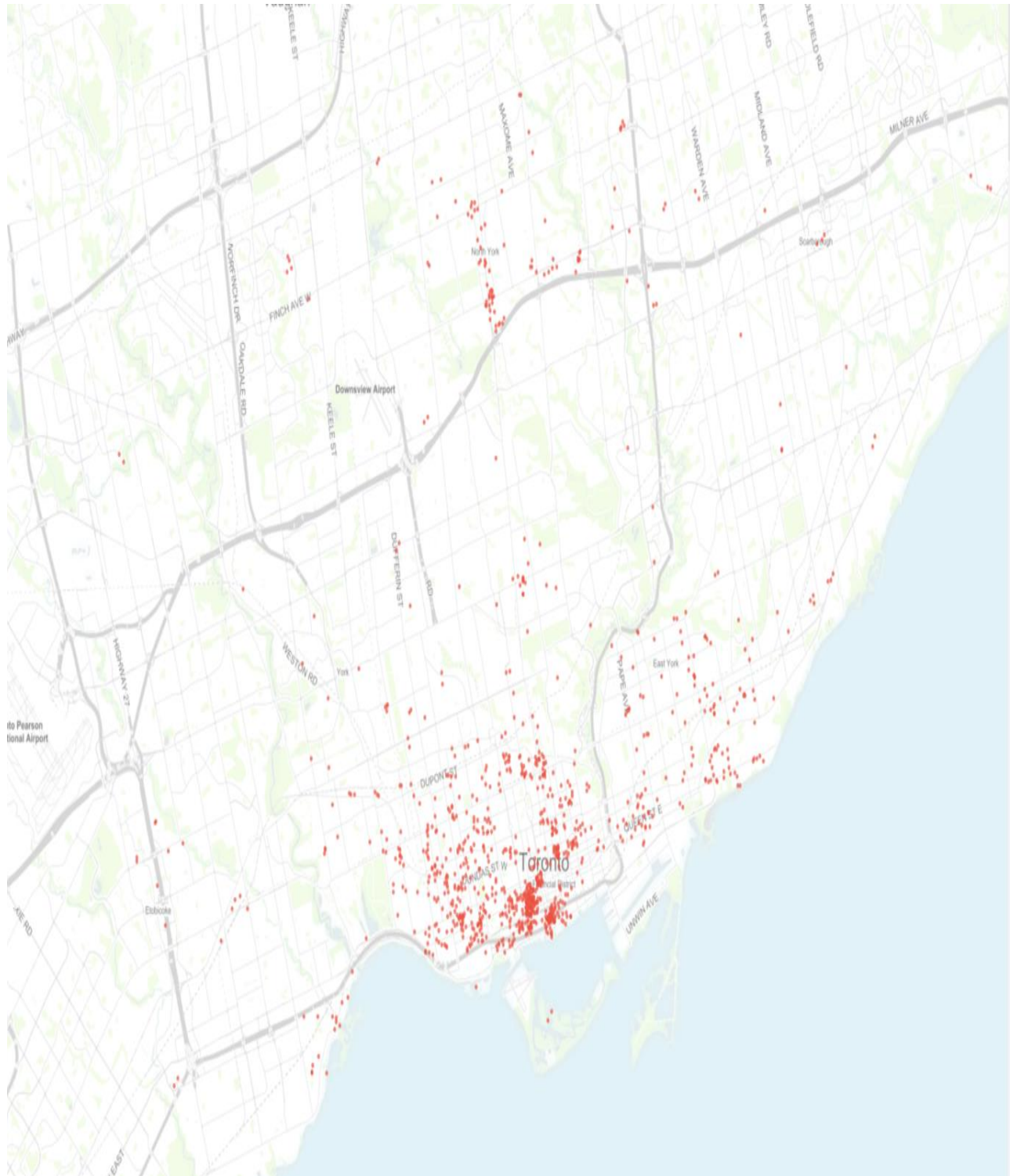
The Independent; Peyton, Matt. (2016) "Berlin Bans Airbnb from Renting Apartments to Tourists in move to Protect Affordable Housing". Retrieved from: <http://www.independent.co.uk/news/world/europe/Airbnb-rentals-berlin-germany-tourist-ban-fines-restricting-to-protect-affordable-housing-a7008891.html>

Wheaton, William C. 1990) "Vacancy, Search, and Prices in a Housing Market Matching Model." Journal Of Political Economy 98, no. 6: 1270.

Zervas, Georgios; Proserpio, Davide and Byers, John. (2014) “The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry”. Boston U School of Management Research Paper No 2013-16. Retrieved from:  
<http://people.bu.edu/zg/publications/Airbnb.pdf>

## Annex E

Annex D displays Airbnb listings in Toronto, Ontario in October 2015



Source: [insideairbnb.com](http://insideairbnb.com) 2015

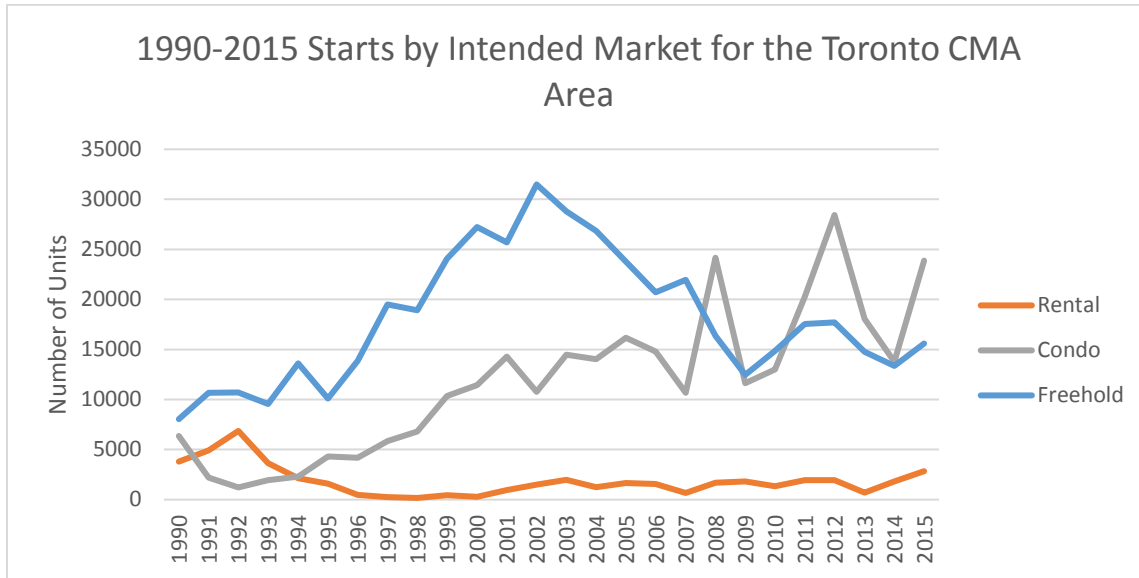
## Annex F

This image shows the format of the dataset, which contains a number of columns that is gathered during a “scraping” analysis.

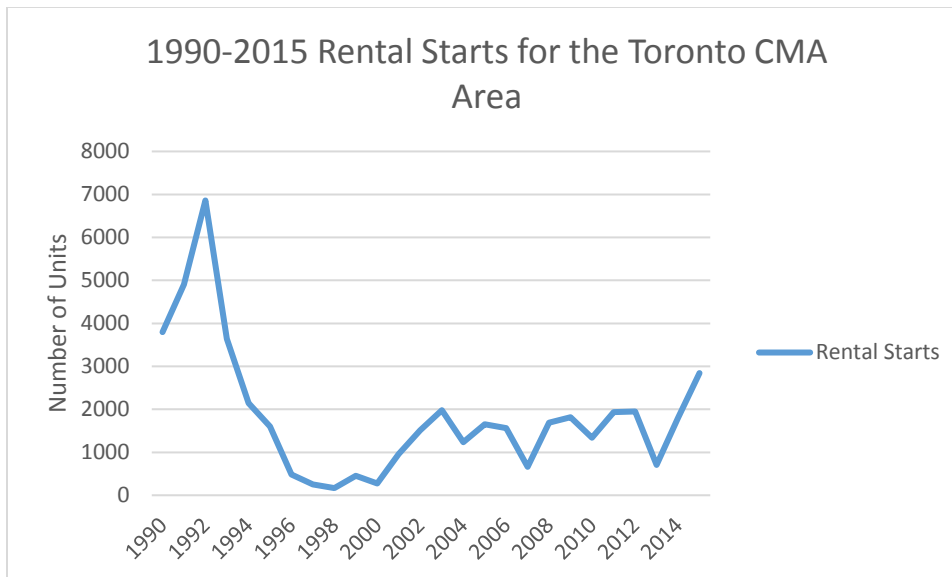
id	listing_url	scrape_id	last_scraped	name	summary	space	description	experience	neighborhood	overview	notes	transit	thumbnail	medium_url	picture_url	picture_host_id	host_url	host_name	host_since	host_location	
1419	https://www.zillow.com/homedetails/1419-Union-St-Toronto-Ontario-M5S-1A5/1419_zpid/	2.02E+13	6/7/2015	Gorgeous m	This large, family Visit To This large, family home is located in one of Toronto's most vibrant downtown neighbo								https://a2.mscache	https://a2.mscache	https://a2.mscache	1565	https://www.zillow.com/homedetails/1419-Union-St-Toronto-Ontario-M5S-1A5/1419_zpid/	Alexandra	8/8/2008	Toronto, Onta	
1419	https://www.zillow.com/homedetails/1419-Union-St-Toronto-Ontario-M5S-1A5/1419_zpid/	2.02E+13	9/3/2015	Beautiful ho	This large, family Visit To This large, none The apartment is To learn a All forms c								https://a2.r	https://a2.n	https://a2	https://a2	1565	https://www.zillow.com/homedetails/1419-Union-St-Toronto-Ontario-M5S-1A5/1419_zpid/	Alexandra	8/8/2008	Toronto, Onta
10314	https://www.zillow.com/homedetails/10314-Union-St-Toronto-Ontario-M5S-1A5/10314_zpid/	2.02E+13	6/7/2015	Union Inn (II	The name 'Union Though The name 'Union Inn' is a play on Annie&E”s hospitality - legendary amongst our friend								https://a1.mscache	https://a1.mscache	https://a1.mscache	35505	https://www.zillow.com/homedetails/10314-Union-St-Toronto-Ontario-M5S-1A5/10314_zpid/	Douglas & Ann	9/1/2009	Toronto, Onta	
10314	https://www.zillow.com/homedetails/10314-Union-St-Toronto-Ontario-M5S-1A5/10314_zpid/	2.02E+13	9/3/2015	Union Inn (II	The name 'Union The 'uni The name none Our charming adc Clean tow Our home								https://a1.r	https://a1.n	https://a1	https://a1	35505	https://www.zillow.com/homedetails/10314-Union-St-Toronto-Ontario-M5S-1A5/10314_zpid/	Douglas & Ann	9/1/2009	Toronto, Onta
13632	https://www.zillow.com/homedetails/13632-Union-St-Toronto-Ontario-M5S-1A5/13632_zpid/	2.02E+13	6/7/2015	Economy Rr	This is a bedroom Cheap, This is a bedroom equipped with 1. bed   with comforters, pillows, mattress cover and								https://a2.mscache	https://a2.mscache	https://a2.mscache	2194	https://www.zillow.com/homedetails/13632-Union-St-Toronto-Ontario-M5S-1A5/13632_zpid/	Erwin	8/17/2008	Toronto, Onta	
13632	https://www.zillow.com/homedetails/13632-Union-St-Toronto-Ontario-M5S-1A5/13632_zpid/	2.02E+13	9/3/2015	Economy Rr	This is a bedroom Cheap, This is a be none Access to Wal-M/ Read the a 24 hours a								https://a2.r	https://a2.n	https://a2	https://a2	2194	https://www.zillow.com/homedetails/13632-Union-St-Toronto-Ontario-M5S-1A5/13632_zpid/	Erwin	8/17/2008	Toronto, Onta
14734	https://www.zillow.com/homedetails/14734-Union-St-Toronto-Ontario-M5S-1A5/14734_zpid/	2.02E+13	6/7/2015	FULLY FURN 1	Bedroom Fully 1 Bedro 1 Bedroom Fully Furnished suite mall stylish unit, prefect for single person / couple. Gre								https://a0.mscache	https://a0.mscache	https://a0.mscache	14656415	https://www.zillow.com/homedetails/14734-Union-St-Toronto-Ontario-M5S-1A5/14734_zpid/	Lijijana	4/23/2014	Toronto, Onta	
14734	https://www.zillow.com/homedetails/14734-Union-St-Toronto-Ontario-M5S-1A5/14734_zpid/	2.02E+13	9/3/2015	FULLY FURN 1	Bedroom Fully 1 Bedro 1 Bedroom none								https://a0.r	https://a0.n	https://a0	https://a0	14656415	https://www.zillow.com/homedetails/14734-Union-St-Toronto-Ontario-M5S-1A5/14734_zpid/	Lijijana	4/23/2014	Toronto, Onta
17464	https://www.zillow.com/homedetails/17464-Union-St-Toronto-Ontario-M5S-1A5/17464_zpid/	2.02E+13	6/7/2015	Toronto Gar	One of the large: One of One of the largest rooms available. It is located on the main floor and furnished with a								https://a0.mscache	https://a0.mscache	https://a0.mscache	67800	https://www.zillow.com/homedetails/17464-Union-St-Toronto-Ontario-M5S-1A5/17464_zpid/	Sam	1/5/2010	Toronto, Onta	
17464	https://www.zillow.com/homedetails/17464-Union-St-Toronto-Ontario-M5S-1A5/17464_zpid/	2.02E+13	9/3/2015	Toronto Gar	One of the large: One of One of the none The home is very Street parl We are located around the corner f								https://a0.mscache	https://a0.mscache	https://a0.mscache	67800	https://www.zillow.com/homedetails/17464-Union-St-Toronto-Ontario-M5S-1A5/17464_zpid/	Sam	1/5/2010	Toronto, Onta	
17611	https://www.zillow.com/homedetails/17611-Union-St-Toronto-Ontario-M5S-1A5/17611_zpid/	2.02E+13	6/7/2015	Central Location	Downtown + Looking Looking for a place to call home in Toronto for the holidays? Visiting family or friends,								https://a2.mscache	https://a2.mscache	https://a2.mscache	63578	https://www.zillow.com/homedetails/17611-Union-St-Toronto-Ontario-M5S-1A5/17611_zpid/	Sarah	12/16/2009	Toronto, Onta	
17611	https://www.zillow.com/homedetails/17611-Union-St-Toronto-Ontario-M5S-1A5/17611_zpid/	2.02E+13	9/3/2015	Central Location	Downtown + Looking Looking fo none								https://a0.r	https://a0.n	https://a0	https://a0	63578	https://www.zillow.com/homedetails/17611-Union-St-Toronto-Ontario-M5S-1A5/17611_zpid/	Sarah	12/16/2009	Toronto, Onta
17936	https://www.zillow.com/homedetails/17936-Union-St-Toronto-Ontario-M5S-1A5/17936_zpid/	2.02E+13	6/7/2015	Large Private	First of all, I'd like Welcon First of all, I'd like to say a BIG Thank You to all of my previous guests. Over 150 review								https://a2.mscache	https://a2.mscache	https://a2.mscache	69169	https://www.zillow.com/homedetails/17936-Union-St-Toronto-Ontario-M5S-1A5/17936_zpid/	Sofia	1/9/2010	Toronto, Onta	
17936	https://www.zillow.com/homedetails/17936-Union-St-Toronto-Ontario-M5S-1A5/17936_zpid/	2.02E+13	9/3/2015	Large Private	First of all, I'd like Welcon First of all, none The building is cer Find a free The street								https://a2.r	https://a2.n	https://a2	https://a2	69169	https://www.zillow.com/homedetails/17936-Union-St-Toronto-Ontario-M5S-1A5/17936_zpid/	Sofia	1/9/2010	Toronto, Onta
18308	https://www.zillow.com/homedetails/18308-Union-St-Toronto-Ontario-M5S-1A5/18308_zpid/	2.02E+13	6/7/2015	Bachelors A	This a basement Cheap, This a basement room that has its private washroom and private kitchen. Entrance to								https://a2.mscache	https://a2.mscache	https://a2.mscache	2194	https://www.zillow.com/homedetails/18308-Union-St-Toronto-Ontario-M5S-1A5/18308_zpid/	Erwin	8/17/2008	Toronto, Onta	
18308	https://www.zillow.com/homedetails/18308-Union-St-Toronto-Ontario-M5S-1A5/18308_zpid/	2.02E+13	9/3/2015	Bachelors A	This a basement Cheap, This a base none Quiet residential neighborho Public Trar								https://a2.r	https://a2.n	https://a2	https://a2	2194	https://www.zillow.com/homedetails/18308-Union-St-Toronto-Ontario-M5S-1A5/18308_zpid/	Erwin	8/17/2008	Toronto, Onta
22647	https://www.zillow.com/homedetails/22647-Union-St-Toronto-Ontario-M5S-1A5/22647_zpid/	2.02E+13	6/7/2015	Home Away	Bright and comfc I have a Bright and comfortable private guest bedroom that is ready to accommodate travelers								https://a1.mscache	https://a1.mscache	https://a1.mscache	85004	https://www.zillow.com/homedetails/22647-Union-St-Toronto-Ontario-M5S-1A5/22647_zpid/	Antoniella	2/24/2010	Toronto, Onta	
22647	https://www.zillow.com/homedetails/22647-Union-St-Toronto-Ontario-M5S-1A5/22647_zpid/	2.02E+13	9/3/2015	Home Away	Bright and comfc I have a Bright and none A nice and live nei Minimum : Public tran								https://a1.r	https://a1.n	https://a1	https://a1	85004	https://www.zillow.com/homedetails/22647-Union-St-Toronto-Ontario-M5S-1A5/22647_zpid/	Antoniella	2/24/2010	Toronto, Onta
22985	https://www.zillow.com/homedetails/22985-Union-St-Toronto-Ontario-M5S-1A5/22985_zpid/	2.02E+13	6/7/2015	Room- friendly	family private Centrall Centrally=located in upscale North Toronto. Two rooms available in a friendly private								https://a2.mscache	https://a2.mscache	https://a2.mscache	89046	https://www.zillow.com/homedetails/22985-Union-St-Toronto-Ontario-M5S-1A5/22985_zpid/	K	3/6/2010	CA	
22985	https://www.zillow.com/homedetails/22985-Union-St-Toronto-Ontario-M5S-1A5/22985_zpid/	2.02E+13	9/3/2015	Room- friendly	family private Centrall Centrally=none								https://a2.r	https://a2.n	https://a2	https://a2	89046	https://www.zillow.com/homedetails/22985-Union-St-Toronto-Ontario-M5S-1A5/22985_zpid/	K	3/6/2010	CA
28160	https://www.zillow.com/homedetails/28160-Union-St-Toronto-Ontario-M5S-1A5/28160_zpid/	2.02E+13	6/7/2015	Entire Apt in	This is Toronto's AVAILA This is Toronto's oldest and most venerable downtown neighbourhood. 100% safe, no								https://a0.mscache	https://a0.mscache	https://a0.mscache	86838	https://www.zillow.com/homedetails/28160-Union-St-Toronto-Ontario-M5S-1A5/28160_zpid/	Rita	3/1/2010	Toronto, Onta	
28160	https://www.zillow.com/homedetails/28160-Union-St-Toronto-Ontario-M5S-1A5/28160_zpid/	2.02E+13	9/3/2015	Luxury Apt B	Toronto's best m AVAILA Toronto's none The subwa								https://a0.r	https://a0.n	https://a0	https://a0	86838	https://www.zillow.com/homedetails/28160-Union-St-Toronto-Ontario-M5S-1A5/28160_zpid/	Rita	3/1/2010	Toronto, Onta
33169	https://www.zillow.com/homedetails/33169-Union-St-Toronto-Ontario-M5S-1A5/33169_zpid/	2.02E+13	6/7/2015	Executive Ur	The Executive Ur A privat The Executive Underground suite is a completely private apartment situated on the bas								https://a2.mscache	https://a2.mscache	https://a2.mscache	140662	https://www.zillow.com/homedetails/33169-Union-St-Toronto-Ontario-M5S-1A5/33169_zpid/	Henry	6/8/2010	Toronto, Onta	
33169	https://www.zillow.com/homedetails/33169-Union-St-Toronto-Ontario-M5S-1A5/33169_zpid/	2.02E+13	9/3/2015	Executive Ur	The Executive Ur A privat The Execu none The location is one of the clk Toronto is								https://a2.r	https://a2.n	https://a2	https://a2	140662	https://www.zillow.com/homedetails/33169-Union-St-Toronto-Ontario-M5S-1A5/33169_zpid/	Henry	6/8/2010	Toronto, Onta
34619	https://www.zillow.com/homedetails/34619-Union-St-Toronto-Ontario-M5S-1A5/34619_zpid/	2.02E+13	6/7/2015	Boutique Hotel	Residence Top enc Top end hotel, world famous for its art scene, two bars , karaoke and restaurant, perfe								https://a2.mscache	https://a2.mscache	https://a2.mscache	149469	https://www.zillow.com/homedetails/34619-Union-St-Toronto-Ontario-M5S-1A5/34619_zpid/	Mm	6/21/2010	CA	
34619	https://www.zillow.com/homedetails/34619-Union-St-Toronto-Ontario-M5S-1A5/34619_zpid/	2.02E+13	9/3/2015	Boutique Hotel	Residence Top enc Top end ht none								https://a2.r	https://a2.n	https://a2	https://a2	149469	https://www.zillow.com/homedetails/34619-Union-St-Toronto-Ontario-M5S-1A5/34619_zpid/	Mm	6/21/2010	CA
40456	https://www.zillow.com/homedetails/40456-Union-St-Toronto-Ontario-M5S-1A5/40456_zpid/	2.02E+13	6/7/2015	Entire Suite in	Downtown+Par ----- IMPORTANT ----- INSTANT BOOKING FOR								https://a1.mscache	https://a1.mscache	https://a1.mscache	174063	https://www.zillow.com/homedetails/40456-Union-St-Toronto-Ontario-M5S-1A5/40456_zpid/	Denis	7/20/2010	Toronto, Onta	
40456	https://www.zillow.com/homedetails/40456-Union-St-Toronto-Ontario-M5S-1A5/40456_zpid/	2.02E+13	9/3/2015	Entire Suite in	Downtown+Par ----- none								https://a1.r	https://a1.n	https://a1	https://a1	174063	https://www.zillow.com/homedetails/40456-Union-St-Toronto-Ontario-M5S-1A5/40456_zpid/	Denis	7/20/2010	Toronto, Onta
41095	https://www.zillow.com/homedetails/41095-Union-St-Toronto-Ontario-M5S-1A5/41095_zpid/	2.02E+13	6/7/2015	Bright, Clean	Comfortable and A large, Comfortable and spacious apartment, conveniently located on Spadina Road in Forest								https://a0.mscache	https://a0.mscache	https://a0.mscache	178311	https://www.zillow.com/homedetails/41095-Union-St-Toronto-Ontario-M5S-1A5/41095_zpid/	Darin	7/23/2010	Toronto, Onta	
41095	https://www.zillow.com/homedetails/41095-Union-St-Toronto-Ontario-M5S-1A5/41095_zpid/	2.02E+13	9/3/2015	Bright, Clean	Comfortable and A large, Comfortal none Forest Hill is one e There is a Spadina Bt								https://a0.r	https://a0.n	https://a0	https://a0	178311	https://www.zillow.com/homedetails/41095-Union-St-Toronto-Ontario-M5S-1A5/41095_zpid/	Darin	7/23/2010	Toronto, Onta
44452	https://www.zillow.com/homedetails/44452-Union-St-Toronto-Ontario-M5S-1A5/44452_zpid/	2.02E+13	6/7/2015	Yonge & Bloor	Studio Skyline Fully fur Fully furnished bachelor studio ( 400 sq.ft ) located on top of the Mariott hotel tower r								https://a2.mscache	https://a2.mscache	https://a2.mscache	195095	https://www.zillow.com/homedetails/44452-Union-St-Toronto-Ontario-M5S-1A5/44452_zpid/	Urbano	8/8/2010	Toronto, Onta	
44452	https://www.zillow.com/homedetails/44452-Union-St-Toronto-Ontario-M5S-1A5/44452_zpid/	2.02E+13	9/3/2015	Yonge & Bloor	Studio Skyline Fully fur Fully furnis none Public Trar								https://a2.r	https://a2.n	https://a2	https://a2	195095	https://www.zillow.com/homedetails/44452-Union-St-Toronto-Ontario-M5S-1A5/44452_zpid/	Urbano	8/8/2010	Toronto, Onta
44460	https://www.zillow.com/homedetails/44460-Union-St-Toronto-Ontario-M5S-1A5/44460_zpid/	2.02E+13	6/7/2015	Yonge & Bloor	2 Bedroom An One r One room in a two-bedroom apartment in the Marriott hotel building at Yonge & Bloor								https://a0.mscache	https://a0.mscache	https://a0.mscache	195095	https://www.zillow.com/homedetails/44460-Union-St-Toronto-Ontario-M5S-1A5/44460_zpid/	Urbano	8/8/2010	Toronto, Onta	

## Annex G

Table 1A



Source: 2016 CMHC (Starts and Completions Survey, Market Absorption Survey, Rental Market Survey, Seniors' Housing Survey, Secondary Rental Market); Statistics Canada (CANSIM)



Source: 2016 CMHC (Starts and Completions Survey, Market Absorption Survey, Rental Market Survey, Seniors' Housing Survey, Secondary Rental Market); Statistics Canada (CANSIM)