

# Factors Influencing Short-Term Accommodation in Christchurch

A Geospatial Analysis by Sophie Kolston

987 words

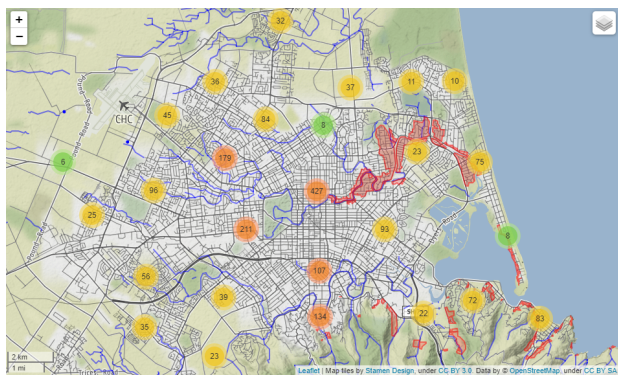
## Introduction

Private short-term accommodation, especially through web-based brokers like Airbnb, is becoming increasingly important for tourism. It offers variation in affordability and location not offered by traditional hotels. The influence of COVID-19 on tourism means that New Zealand is one of the few places where short-term accommodation is currently available. This blog post will focus on one of NZ's main centres, Christchurch. We will look into various factors that effect affordability and supply of Airbnb properties, from accessibility to socioeconomic conditions. We will even see if proximity to Christchurch's infamous earthquake redzone impacts these factors.

## The Data

Data selected for this analysis are freely available for anyone to repeat my methods. I chose the NZ Deprivation Index to serve as a measure of socioeconomic conditions as it is well-documented and commonly accepted as being far superior to the Decile system. Accessibility was measured by the Waka Kotahi Centreline dataset (roads). Desireability was measured by distance away from non-habitable earthquake redzones (which are mostly empty lots of liquifaction from the 2011 earthquake) and proximity to waterways. Redzones are defined by the Earthquake Commission (EQC) with accompanying spatial boundaries. Waterways were represented by a Land Information NZ (LINZ) major river dataset.

**Figure 1:** Map of Clustered Airbnb Property Locations, and Selected Contextual Layerssee footnotes (0)

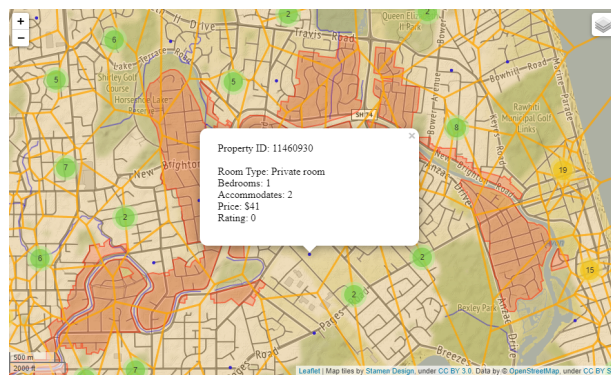


All data were uploaded to a PostGres server, analyzed and manipulated within Python (more information can be found in the accompanying Jupyter Notebook). Figure 1 shows the clusters of Airbnb properties, with some context layers (roads, basemap and redzones). Already we can see patterns emerging, to be explored in the sections that follow.

## Accessibility and Socioeconomic Conditions

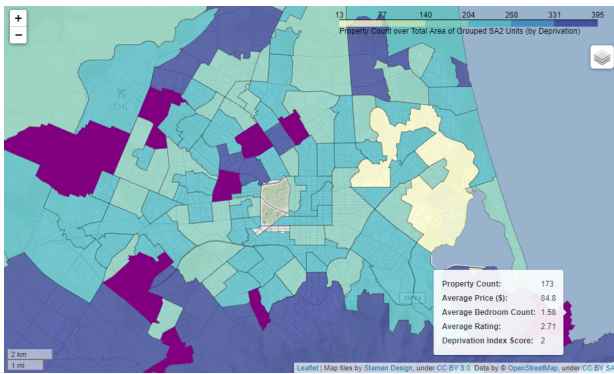
If we zoom in to the interactive map on Figure 1, we can see more of a fine-grained perspective of accessibility (see Figure 2). Creating Voronoi polygons (orange) around individual properties we can see how accessibility is not an issue for any properties, defined by roads (black). This road network of x km serves all of these properties well, so we can exclude road accessibility as a factor on these properties. Of course, we can only make this conclusion as our area of interest is highly urbanized.

**Figure 2:** Map of Clustered Airbnb Property Locations showing Interactivity and Voronoi Crossover



The effect of socioeconomic health on property price and desireability, however, is unlikely to be unaffected by the urban environment. Figure 3 shows an initial analysis where Airbnb properties are grouped by the neighbourhood they are located (defined by Stats NZ SA2 Units), and these neighbourhoods are merged by their level of socioeconomic deprivation. Here we can see that property counts tend to line up with deprivation level, where higher levels of deprivation have lower property counts. This map also shows how areas of similar deprivation tend to be clustered together. This mapped data is shown on Table 1.

**Figure 3:** Map of SA2 Units grouped by Deprivation with Airbnb Property Information

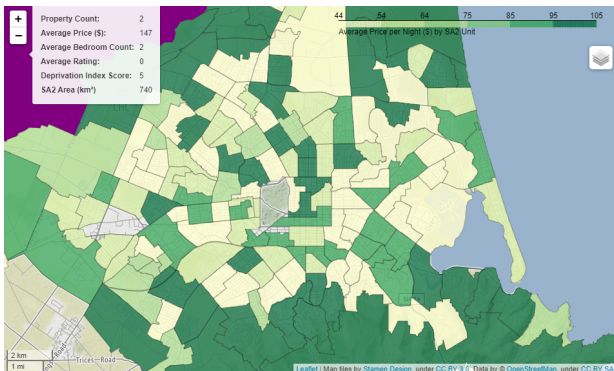


**Table 1:** Property Information by Deprivation Score

Deprivation Index Score	Airbnb Property Count	Average Price (\$)	Average Review Score (/5)	Average Bedroom Count
0	1.0	395	78.10	2.23
1	2.0	173	84.80	2.71
2	3.0	234	96.27	2.87
3	4.0	197	79.72	2.79
4	5.0	197	74.11	2.62
5	6.0	244	78.46	3.07
6	7.0	216	63.31	2.72
7	8.0	255	69.66	2.49
8	9.0	145	67.52	2.99
9	10.0	13	54.00	3.08

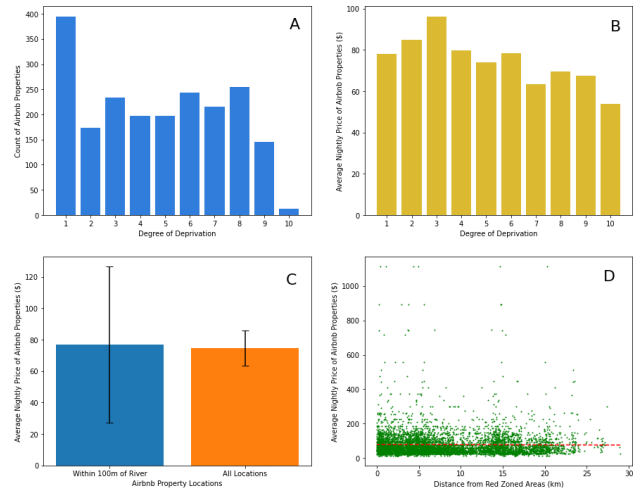
Now we can unmerge the neighbourhoods so that each area is independent and we can find more fine-grained trends. Figure 4 shows property data within each neighbourhood, a choropleth map coloured by average price per night per neighbourhood.

**Figure 4:** Map of SA2 Units with Airbnb Property Information



Prices tend to go down as level of deprivation goes up, although not to an extremely strong degree. Interestingly, average review score tends to go up, while bedroom count is fairly constant. This may be an issue of supply versus demand, which we can confirm with some statistical visualization. Selected plots from the joined data is shown on Figure 5. 5A shows how as deprivation goes up, supply goes down. 5B shows how as deprivation goes up, price goes down - both as would be expected.

**Figure 5:** Plots of Joined Data



## Desireability of Location

Desireability was defined as distance from redzones, and proximity to waterways. The latter seems to make no difference on price, as can be seen on Figure 5C. There is a slight difference in price when within 100m of a river, but the margin of errors are massive and so we can conclude this is not a factor (I have excluded the map of this phenomena for brevity, please see the Notebook if you are interested).

**Figure 6:** Map of Airbnb Properties showing Distance to Redzones

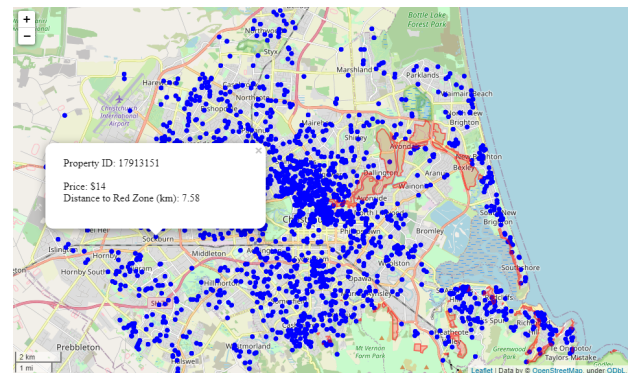


Figure 6 shows the redzones, with airbnb points and their distance to the closest redzone. These data are plotted on Figure 5D. Here we can see almost no change in property price as distance away increases. This is likely due to red-zones, while intrinsically undesirable, tend to be near the CBD where property prices are higher in general.

## Conclusions

Overall, property prices don't tend to show much variation over Christchurch. The predominant factor is socioeconomic health, which should be considered when choosing a short-term accommodation as it has a significant affect on property type, price, and supply. The Earthquake Commission might be interested to see how little impact red zones make on property prices, which may be relevant for future planning.

In future analyses, we might want to consider other factors in desirability, as proximity to waterways was not a good barometer. That being said, it was interesting to see how little difference it did make. If I were looking at an Airbnb property in Christchurch, I would look for one that was close to a river and far from a red zone, while still being well-priced as this blog post shows.

Note that the Airbnb data was based on a single month as explained in the Notebook, as publically-available Airbnb data for New Zealand is difficult to obtain.

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Jupyter Notebook included

Source code, high-res figures available on GitHub

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<sup>0</sup>The interactivity of these maps makes it impossible, and needless, to show a legend in the screenshots. Please load up the notebook to have a look, where you can control which layers are in view