Executive summary

Overview:

Airbnb has become an increasingly popular home-sharing platform in London over the past years. Advocates believe that it contributes positively to London’s economy and alleviates the tourism pressure in the city centre, as it disperses tourists to outer boroughs (Airbnb, 2016). However, some suspect that many activities on these platforms are becoming a new form of de facto hotel. This raises the concern of aggravating the housing crisis, characterised by undersupply and unaffordability.

Relevant regulation in short-term lettings has been introduced to protect housing for long-term residents (Mayor of London, 2019), but only Airbnb has voluntarily implemented it since 2017, by capping the maximum occupied nights of short-term letting properties to 90 days per year. Accordingly, we set out to answer two questions using spatial analysis:

1. The impact of Airbnb on the private rental market: is there a relationship between the number of Airbnb listings and average rent?
2. The effectiveness of the current regulation in home-sharing platforms: is the 90-day rule effective in protecting the local housing market?

Question 1: Is Airbnb density driving up the average rent in London boroughs?

To normalise the number of Airbnb listings, Airbnb density is calculated by dividing number of listings by the total number of dwellings in each borough.

As observed in Figure 1, Airbnb density and average rent in inner London are both larger than those of outer boroughs. Despite their growth over the years, they have been following similar patterns from 2016 to 2019. A linear regression (LR) model has been developed to investigate their correlation. With a $R^{2}$ value of $0.795$ and a negligible p-value ($\ll0.05$), this LR model shows that the relationship between Airbnb densities and average rent in London can be summarised as linear.

However, as suggested by the residual analysis of the LR model, spatial autocorrelation is an issue, where higher values of densities and rent tend to cluster. Figure 2 maps the local Moran's I, where areas with values greater than 0 is where the LR model significantly underpredicts the average rent for that specific borough and its surroundings (Brusilovskiy, no date). Therefore, a spatial lag (SL) model has also been built, adding a variable that averages the neighbouring values of a location, which accounts for the spatial dependencies in our data.

To conclude the answer to question 1, using the LR and improved SL model, we found that Airbnb density is positively correlated with the average rent in London boroughs.

Question 2: Is the 90-day limit effective in protecting the private rental market in all London boroughs?

To assess this effectiveness, we characterise the impact of Airbnb on the rental market to two parts: whether the 90-day rule suppresses the growth of average rent with respect to Airbnb density, and whether it limits the expansion of Airbnb density.

Using the SL model developed before, which is trained by data in 2016, we predicted the average rent with different Airbnb densities, namely the Airbnb densities in the same boroughs in 2018.

We found that the actual average rents in most boroughs in 2018 are less than the predicted rent by the SL model, meaning the ratio of rent by density has decreased. This indicates that the average rent in the private rental market in most boroughs has not been growing faster than the density of Airbnb listings. Consequently, this illustrates that the 90-day rule, introduced in 2017 on the Airbnb platform, has been effective in controlling the expansion rate of rent relative to Airbnb densities, thus reducing the effect of the number of Airbnb listings on the local rental market.

However, some boroughs exhibit different characteristics. As shown in Figure 3, the expansion of densities of Airbnb listings in Harrow, Ealing and Richmond Upon Thames has exceeded predicted values. This proves that the 90-day limit in these boroughs is not as effective. Therefore, we argue that a city-wide regulation is not sufficient for outer London boroughs, as short-term lettings are expanding faster than those in the city centre.

Moreover, we should also consider whether the expansion of Airbnb densities has been controlled by the 90-day limit. We investigated the growth of Airbnb density over the course of 2015 to 2019 and found that a quadratic polynomial better describes the trend. As seen from Figure 4, 2017 saw a small decrease in the rate of expansion, which could be explained by the introduction of the 90-day limit on the Airbnb platform. Additionally, as evidenced by a larger r2 value, an indicator of goodness of fit, the sublinear relationship fits better to our Airbnb density data. This indicates the effectiveness of the 90-day limit, as it not only prevented the growth of Airbnb density at the time of introduction, but also forecast a decreasing trend after it was in place.

To summarise the answer to question 2, the 90-day limit has been extremely successful in limiting the impacts of Airbnb to the local rental market in the majority of London, as it has been reducing the growth of short-term lettings from the day 1 and has made a lasting difference ever since.

Conclusion

The main objective of this report is to assess the role of short-term letting platforms in the private rental market and the effectiveness of relevant regulation, using Airbnb in London during 2015 to 2019 as a case study. Our analysis found that while number of Airbnb listings positively correlates with the average rent in London boroughs, the 90-day limit introduced on the platform has been significantly effective in protecting the residents in local rental market. Additionally, we also found that a city-wide regulation may not be sufficient as outer boroughs need more attention.

In addition to a need for borough-specific short-lettings regulation, policymakers should also enforce this London-wide 90-day rule on other home-sharing platforms, developing this rule to be a sector-wide operation. They should act together to decrease the potential risks to the London rental market imposed by commercial house-sharing. Recommendations for implementing and possibly improving the existing rules are as follows:

1. All existing home-sharing platforms should set the 90-day limit for hosts as default and remind them of this regulation in their terms and agreements.
2. Local authorities should enforce this rule when short-letting platforms are registered at the beginning.
3. Local authorities in outer boroughs could plan a new regulation for distributing their short-term housing supply more carefully, with more attention given to the boroughs that haven’t been able to boost their economy in the past years.

Airbnb. (2016). *Discover Greater London: The impact of sharing an authentic London.* Available at: https://www.airbnbcitizen.com/wp-content/uploads/2016/02/DiscoverGreaterLondon\_Report\_HIGH\_RES.pdf.

Brusilovskiy, E. (no date). ‘Spatial Regression: A Brief Introduction’. Available at: http://www.bisolutions.us/A-Brief-Introduction-to-Spatial-Regression.php.

Mayor of London. (2019). ‘Mayor calls for registration system to enforce short-term letting law’, 23 April. Available at: https://www.london.gov.uk/press-releases/mayoral/registration-system-for-short-term-letting-law.