

Group Name's Group Project

1. Who collected the InsideAirbnb data?

(2 points; Answer due Week 7)

An inline citation example: As discussed on [], there are many...

A parenthetical citation example: There are many ways to research Airbnb [...]...

2. Why did they collect the InsideAirbnb data?

(4 points; Answer due Week 7)

This way is also supposed to work (`{python} f"{{df.shape[0]}:{}}"`) but I've found it less reliable.

3. How did they collect it?

(5 points; Answer due Week 8)

4. How does the method of collection (Q3) impact the completeness and/or accuracy of the InsideAirbnb data? How well does it represent the process it seeks to study, and what wider issues does this raise?

(11 points; Answer due Week 9)

5. What ethical considerations does the use of the InsideAirbnb data raise?

(18 points; Answer due ?var:assess.group-date)

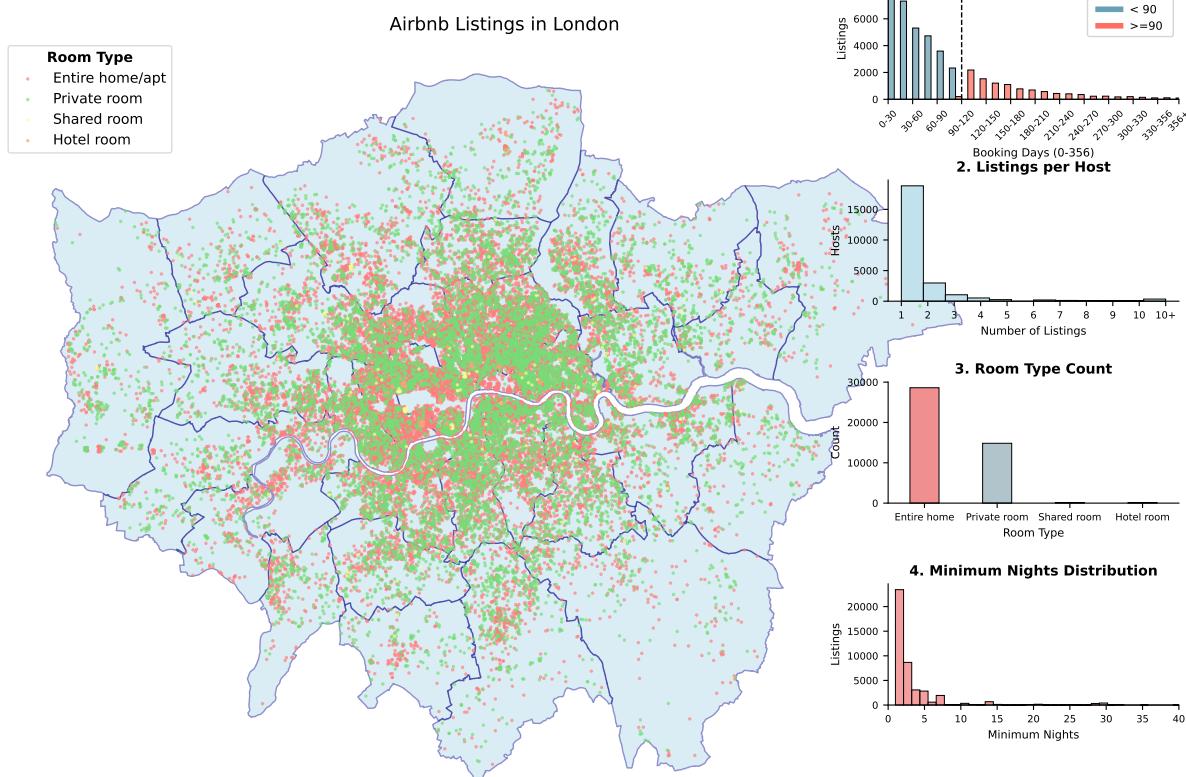
6. With reference to the InsideAirbnb data (i.e. using numbers, figures, maps, and descriptive statistics), what does an analysis of Hosts and the types of properties that they list suggest about the nature of Airbnb lettings in London?

(15 points; Answer due ?var:assess.group-date)

The 90-Day Rule and Airbnb Commercialization

Airbnb has reduced long-term rentals, raised rents, and driven commercialization in London's housing market. The 90-day rule limits entire-home short-term rentals to 90 days per year without special planning permission (Greater London Authority, 2023), but enforcement depends on self-reporting, which is weak. To address this, we use InsideAirbnb data to analyze booking patterns, host behavior, and property types to assess commercialization and compliance risks. Let's start by conducting an initial observation of the data

Figure 1: Airbnb Listings Analysis in London



Key Findings

1. Central London is a Compliance Hotspot:

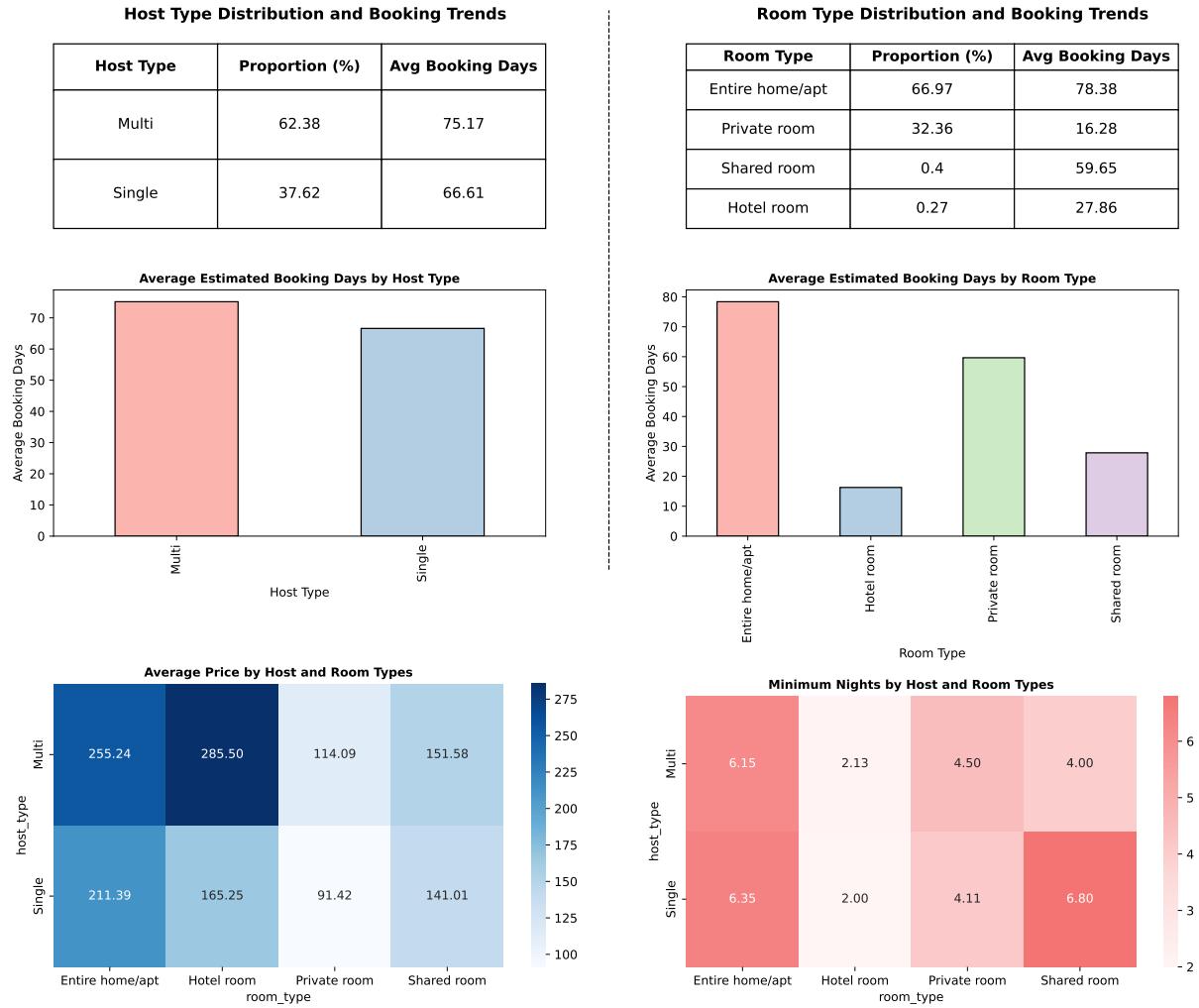
Central London shows the highest concentration of short-term rentals, with entire homes dominating in high-demand areas prone to violations of the 90-day rule (Figure 1, Map).

2. Frequent Breaches of the 90-Day Limit:

Booking data, based on reviews, pricing, and minimum nights (InsideAirbnb, 2023), shows entire homes and hotel-like properties often exceed the 90-day limit, especially in commercialized areas (Figure 1, Panel 1).

To address the limitations of using only snapshot data, we merged datasets from December 2023 to September 2024 and removed duplicates to ensure greater accuracy

Figure 2: Analysis of Airbnb Listings by Host and Room Types



3. Multi-Listing Hosts Dominate the Market:

Multi-listing hosts manage 62.38% of Airbnb listings with longer average booking durations than single-listing hosts. They primarily operate entire homes and hotel-like properties, which are highly commercialized with shorter stays and higher prices (Figure 2, Top Left; heatmap).

4. Entire Homes are the Highest Risk:

Entire homes make up 66.97% of listings, with the highest average booking days, and are most likely to breach the 90-day rule. Hotel-like properties, while fewer, also show risks due to short minimum stays (2.13 nights) and high commercialization (Figure 2, Top Right; heatmap).

Summary and Next Steps

InsideAirbnb data shows London's Airbnb market is highly commercialized, with significant 90-day rule compliance risks, requiring effective enforcement.

Spatial Insights: Airbnb listings are clustered in high-risk areas - further spatial analysis is needed to assess impacts and identify drivers of non-compliance for better regulation.

Policy Violation Factors: Multi-listing hosts and commercialized properties, such as entire homes and hotel-like listings, are major contributors to non-compliance. Different factors (e.g. property type, cost, location...) need further regression analysis to improve enforcement.

7. Drawing on your previous answers, and supporting your response with evidence (e.g. figures, maps, EDA/ESDA, and simple statistical analysis/models drawing on experience from, e.g., CASA0007), how could the InsideAirbnb data set be used to inform the regulation of Short-Term Lets (STL) in London?

(45 points; Answer due ?var:assess.group-date)

We decided to further analyze the December 2023 Inside Airbnb dataset to provide evidence on the link between Airbnb activity and policy violations. The next steps are:

1. Identifying Violation Hotspots and Impacts:

Spatial clustering will identify areas with high concentrations of 90-day rule violations. These hotspots will be analyzed for impacts on local communities, focusing on rising rents, reduced housing availability—issues tied to Airbnb-driven gentrification (**smith2006?**).

2. Analyzing Drivers of Violations:

Regression analysis helps identify key factors driving these violations (e.g. property type, host behavior, price and location...)

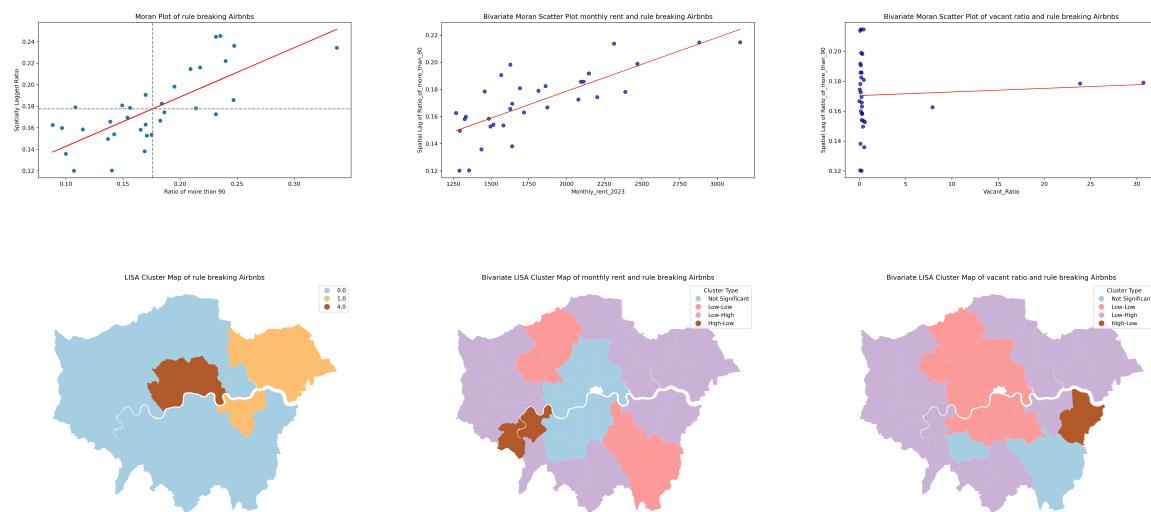
This approach will highlight the need for effective regulation, and clarify enforcement priorities to enhance the efficiency of enforcement efforts.

Spatial Analysis of Policy Violations and Local Impacts

Hotspot Identification:

We analyzed the spatial clustering of Airbnb rule-breaking properties using Moran's I and LISA cluster maps (Figure 3). High-High clusters were found in central boroughs, such as Westminster, and eastern areas like Hackney, where violations are linked to a combination of high tourism demand, profitability of short-term rentals, and housing market pressures (Bosma and Doorn, 2024).

Figure 3: Results of Moran and LISA analysis of rule breaking Airbnbs, monthly rent and vacancy ratio



Housing Market Impacts

To quantify these impacts, we applied SAR and GWR models (Figure 4). The SAR analysis showed that violations contributed to rising rents and increased vacancy rates, with the strongest effects observed in central areas where tourism dominates and in eastern boroughs with emerging rental markets. GWR results highlighted spatial variability, with the highest rent surges in central London and higher vacancy rates in eastern boroughs. Similar findings as (Jain *et al.*, 2021).

Optimal Bandwidth Size for Rent: 27.0

Model type	Gaussian
Number of observations:	32
Number of covariates:	2

Global Regression Results

Residual sum of squares:	2861190.859
Log-likelihood:	-227.822
AIC:	459.644
AICc:	462.502
BIC:	2861086.887
R2:	0.580
Adj. R2:	0.566

Variable	Est.	SE	t(Est/SE)	p-value
X0	498.858	209.905	2.377	0.017
X1	7632.613	1185.077	6.441	0.000

Geographically Weighted Regression (GWR) Results

Spatial kernel:	Adaptive bisquare
Bandwidth used:	27.000

Diagnostic information

Residual sum of squares:	2397300.358
Effective number of parameters (trace(S)):	4.965
Degree of freedom (n - trace(S)):	27.035
Sigma estimate:	297.780
Log-likelihood:	-224.992
AIC:	461.913
AICc:	465.232
BIC:	470.656
R2:	0.648
Adjusted R2:	0.581
Adj. alpha (95%):	0.020
Adj. critical t value (95%):	2.450

Summary Statistics For GWR Parameter Estimates

Variable	Mean	STD	Min	Median	Max

X0	523.732	79.898	379.795	523.955	719.631
X1	7712.747	485.361	6923.059	7671.554	8700.834

None

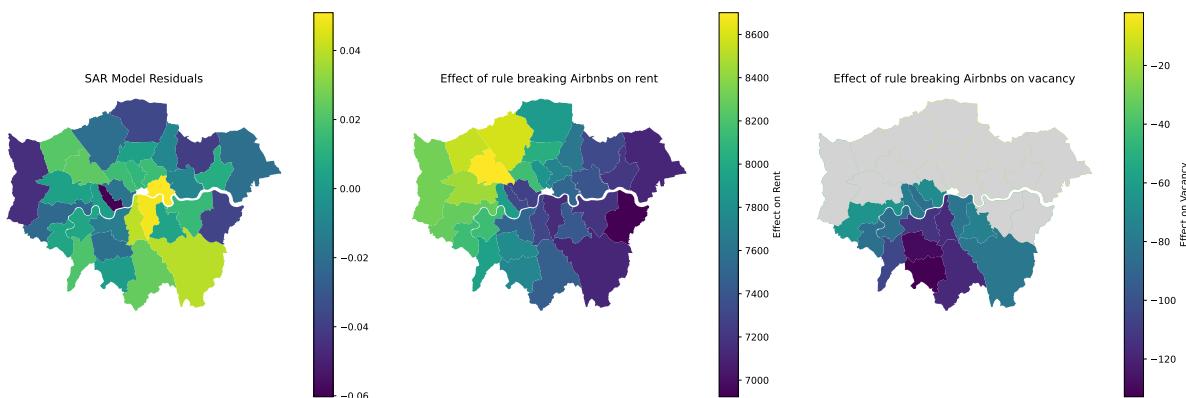
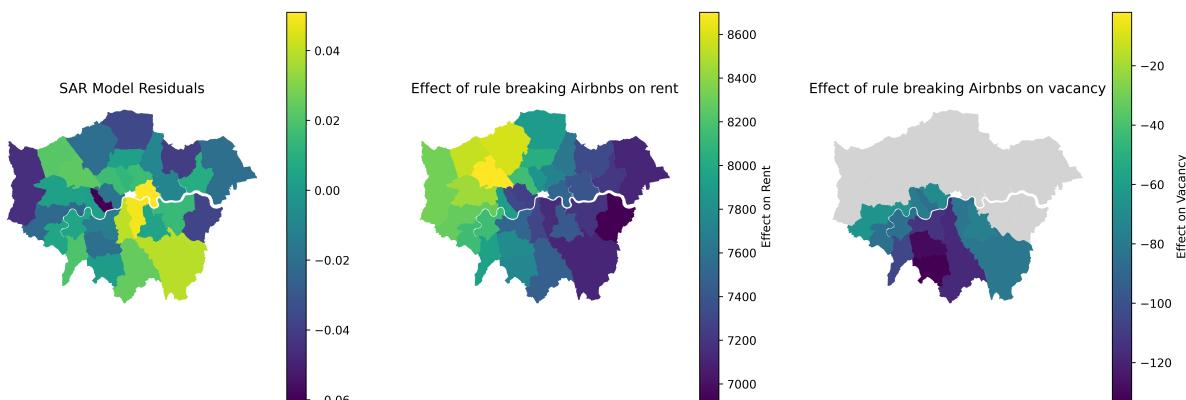


Figure 4: Results of SAR and GWR Analysis of the Effect of Rule-Breaking Airbnbs on Monthly Rent and Vacancy Ratio



From the analysis above, enforcing the 90-day policy is essential to address rising rents, increasing vacancy rates, and spatial inequality driven by short-term rentals, thereby preserving housing affordability and community stability in affected hotspots.

Sustainable Authorship Tools

Using the Terminal in Docker, you compile the Quarto report using `quarto render <group_submission_file>.qmd`.

Your QMD file should automatically download your BibTeX and CLS files and any other required files. If this is done right after library loading then the entire report should output successfully.

Written in Markdown and generated from [Quarto](#). Fonts used: [Spectral](#) (mainfont), [Roboto](#) (sansfont) and [JetBrains Mono](#) (monofont).

References

- Crommelin, L., Troy, L., Martin, C., & Pettit, C. (2018). Is Airbnb a sharing economy success or an urban menace? *Cities*, 72, 177–185.
- Greater London Authority. (2023). Guidance on short-term and holiday lets in London. Retrieved from <https://www.london.gov.uk>
- InsideAirbnb. (2023). Inside Airbnb: Adding data to the debate. Retrieved from <http://insideairbnb.com>
- Wachsmuth, D., & Weisler, A. (2018). Airbnb and the rent gap: Gentrification through the sharing economy. *Environment and Planning A: Economy and Space*, 50(6), 1147–1170.

Bosma, J.R. and Doorn, N. van (2024) ‘The gentrification of airbnb: Closing rent gaps through the professionalization of hosting’, *Space and Culture*, 27(1), pp. 31–47. Available at: <https://journals.sagepub.com/doi/full/10.1177/12063312221090606>.

Greater London Authority (2023) ‘Guidance on short-term and holiday lets in london’. <https://www.london.gov.uk>.

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Jain, S. et al. (2021) ‘Nowcasting gentrification using airbnb data’, *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW1), pp. 1–21. Available at: <https://dl.acm.org/doi/10.1145/3449112>.