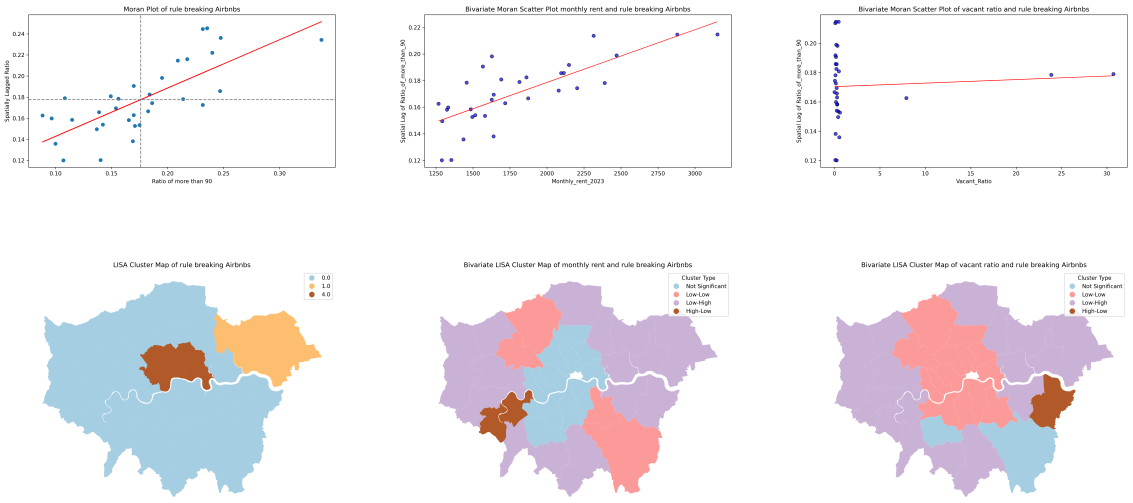
Moran, LISA, SAR & GWR

Figure 1: Results of Moran and LISA analysis of rule breaking Airbnbs, monthly rent and vacancy ratio



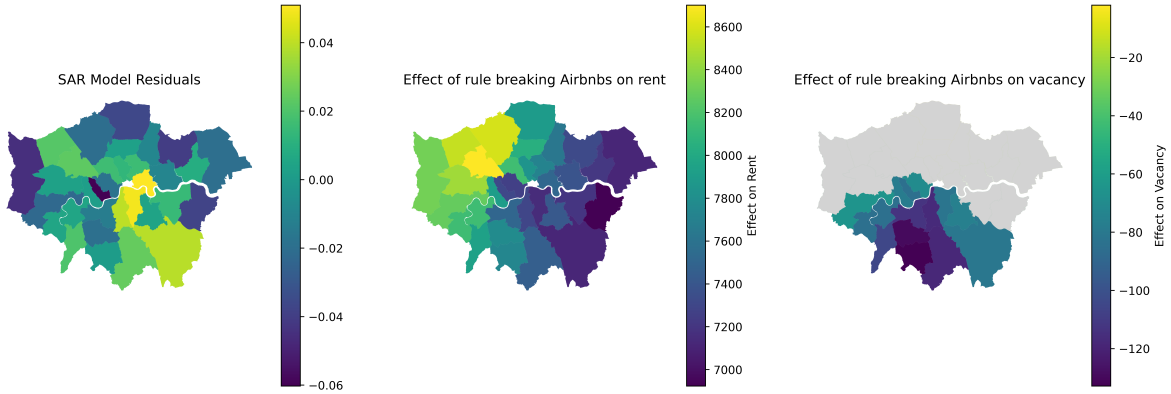
Moran test result

1. Rule-breaking Airbnbs exhibit significant spatial clustering (positive spatial autocorrelation), meaning these properties are not randomly distributed but are concentrated in specific areas, primarily in central and eastern London.
2. The scatter plots further show a positive relationship between rule-breaking Airbnbs and both monthly rents and vacancy ratios, suggesting that areas with higher Airbnb violations also face increased rents and vacancies.

LISA test result

The LISA cluster maps highlight "hotspots" where rule-breaking Airbnbs are spatially significant: 1. Rule-breaking Airbnbs: Central London (e.g., Westminster) and parts of eastern London show significant clustering (brown regions). 2. Monthly Rent: High Airbnb violations coincide with high rent clusters (High-High), reinforcing the pressure on housing affordability. 3. Vacancy Rates: Similar High-High clusters are observed in eastern London, suggesting a correlation between high Airbnb violations and increased vacancy rates in certain neighborhoods. Conversely, areas with Low-Low clusters (e.g., northern and southwestern boroughs) indicate regions with lower Airbnb activity and minimal impact on rents or vacancies.

Figure 2: Results of SAR and GWR Analysis of the Effect of Rule-Breaking Airbnbs on Monthly Rent and Vacancy Ratio



SAR model result

1. The residuals map indicates that the model captures most spatial variations but leaves some unexplained patterns, especially in central boroughs.
2. Effect on Rent: Boroughs with high Airbnb violations (e.g., central and inner eastern areas) show a strong positive effect on monthly rents, confirming that Airbnb activity drives up rental prices.
3. Effect on Vacancy: Significant positive impacts are observed in specific eastern and southern areas, where Airbnb violations correlate with higher housing vacancy rates.

GWR model result

1. The spatial variability captured by GWR confirms that the relationship between Airbnb violations, rents, and vacancies is non-stationary. In central London, the effect on rents is pronounced, while in eastern boroughs, the effect on vacancy rates is stronger.

2. This spatial heterogeneity indicates that Airbnb's impact is location-dependent, with the most severe effects concentrated in areas of high demand.

Conclusion

These patterns underscore Airbnb's role in gentrification, a process where local residents—especially lower-income households—are displaced due to rising living costs Jain et al. (2021). As short-term rentals become more profitable, landlords are incentivized to convert long-term housing into Airbnbs, reducing housing availability for local tenants and driving up competition for remaining rental units Bosma and van Doorn (2024) . The impacts are particularly severe in central neighborhoods like Westminster and spreading into eastern boroughs, where vacancy rates increase, further destabilizing communities.

Gentrification does not only lead to physical displacement but also causes cultural displacement, as long-standing communities lose affordable housing and essential social ties. Local businesses catering to residents may also suffer as short-term tourism replaces neighborhood-oriented consumption patterns.

In essence, Airbnb rule-breaking accelerates the gentrification process by prioritizing tourism-driven economic gains over the housing needs of local communities, exacerbating social inequalities.

References

Bosma, J. R. & van Doorn, N. (2024) The Gentrification of Airbnb: Closing Rent Gaps Through the Professionalization of Hosting. *Space and culture*. [Online] 27 (1), 31–47. Jain, S. et al. (2021) Nowcasting Gentrification Using Airbnb Data. *Proceedings of the ACM on human-computer interaction*. [Online] 5 (CSCW1), 1–21.