

Analysis of NYC Airbnb Listings

Abstract

This report presents an exploratory data analysis (EDA) of Airbnb listings in New York City. The analysis investigates how Airbnb has influenced the housing market, particularly whether it has exacerbated housing shortages for residents by shifting housing supply towards short-term rentals for tourists and business travelers.

Introduction

Airbnb facilitates the temporary rental of housing spaces, primarily for tourism and conference events. This study examines a dataset containing information on listing prices, review counts, geolocation, and other metadata. The primary objective is to assess the impact of Airbnb on the housing supply in New York City and determine if it has led to increased competition for long-term housing.

Hypotheses

Hypothesis I: Impact on Housing Supply

Statement: Airbnb disrupts the housing supply by incentivizing the listing of homes and apartments for short-term rentals, reducing the availability of long-term rental options for NYC residents.

- Observation: The dataset indicates that entire homes and apartments are predominantly listed, potentially reducing long-term housing availability.
- Figures:
 - Fig 1: Distribution of Airbnb listings across NYC boroughs, showing Manhattan with the highest number of listings and Staten Island with the lowest.
 - Fig 2: Correlation between the number of listings per host and average reviews, revealing that hosts with multiple listings tend to have fewer reviews, suggesting lower activity levels.
 - Fig 3: Dominance of entire homes/apartments in listings, highlighting the reduced availability of long-term housing options for residents.

Fig 1 listings in each borough/city

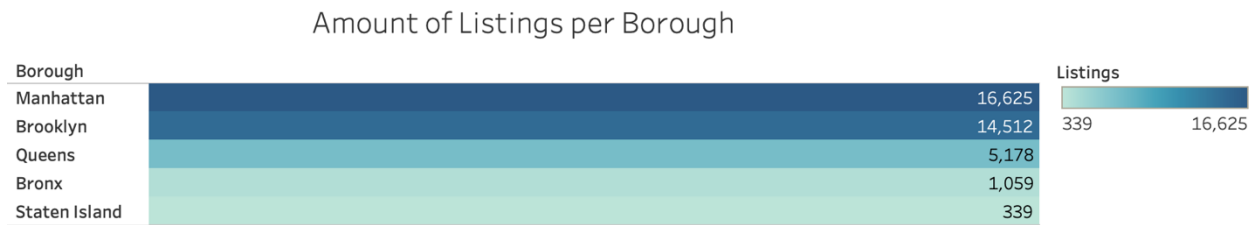


Fig 2 Pie chart of listings based on the room type [home, hotel, private, and shared]

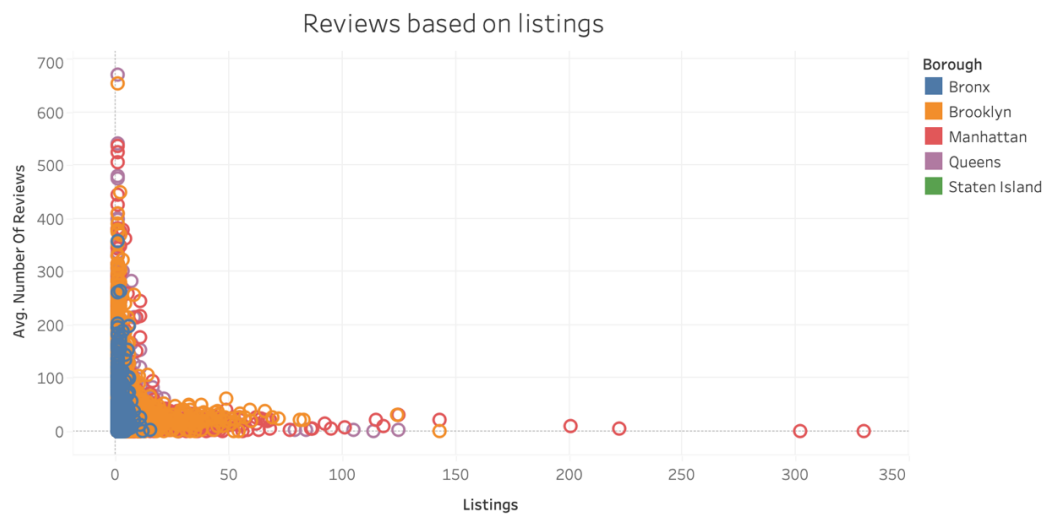
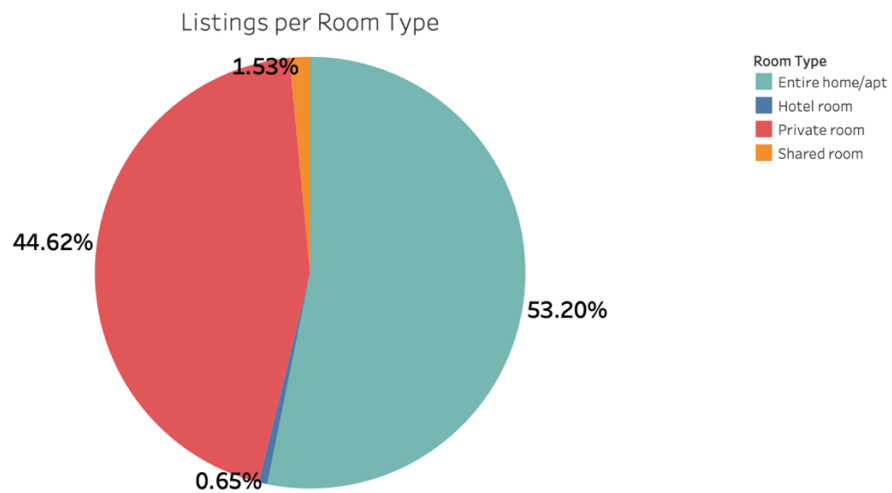


Fig 3 the average night stayed for each room type



Pie chart of listings based on the room type [home, hotel, private, and shared]

Hypothesis II: Location-Based Pricing and Availability

Statement: Location influences the pricing, availability, and type of Airbnb listings.

- Observation: Higher-priced listings are concentrated in areas like Manhattan, whereas Staten Island has lower prices and fewer listings.
- Figures:
 - Fig 4: Average nightly prices by borough, with Manhattan being the most expensive and Staten Island the least.
 - Fig 5: Minimum stay requirements by borough, with higher minimums in more expensive areas.
 - Fig 6: Availability trends, indicating that higher-cost areas like Manhattan and Queens have lower availability due to longer minimum stay requirements.

Fig 4 the average price based on the boroughs/city

Pricing for Each Borough

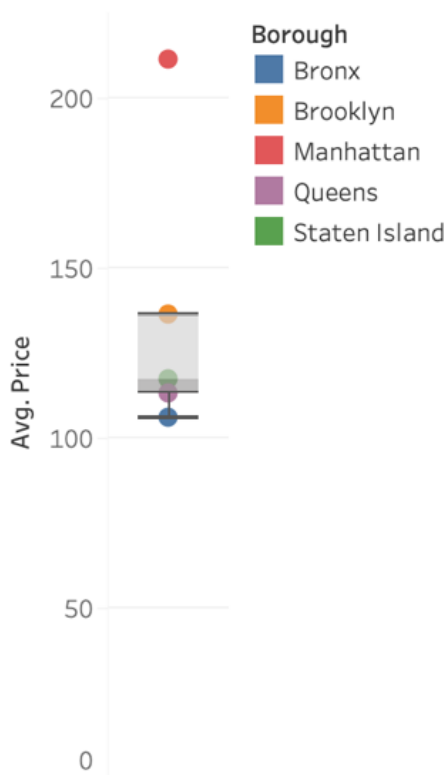


Fig 5 the most common intervals of nights stay for each borough/city

Minimum Nights Stayed

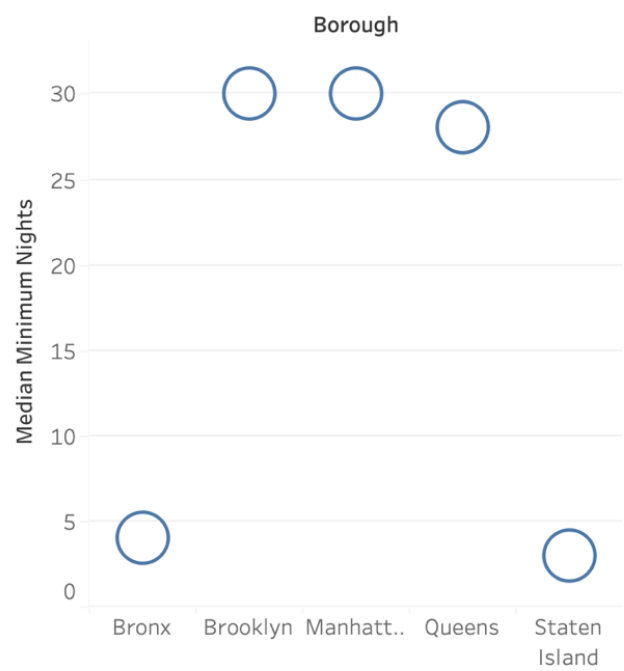
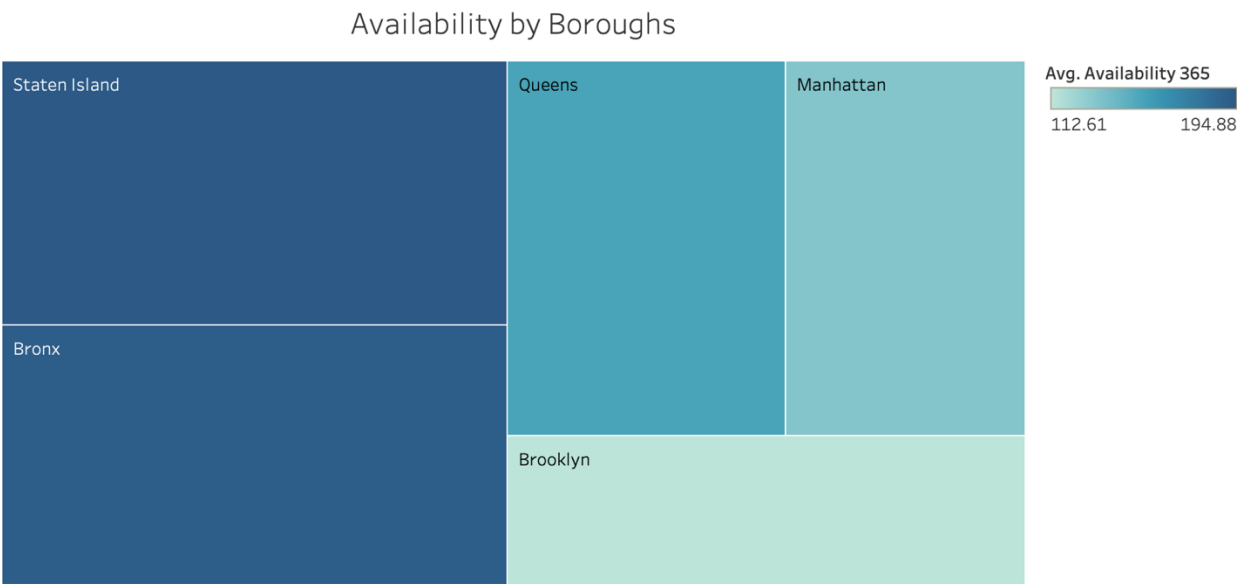


Fig 6 Average availability [based on a 365-day calendar] for each borough/city

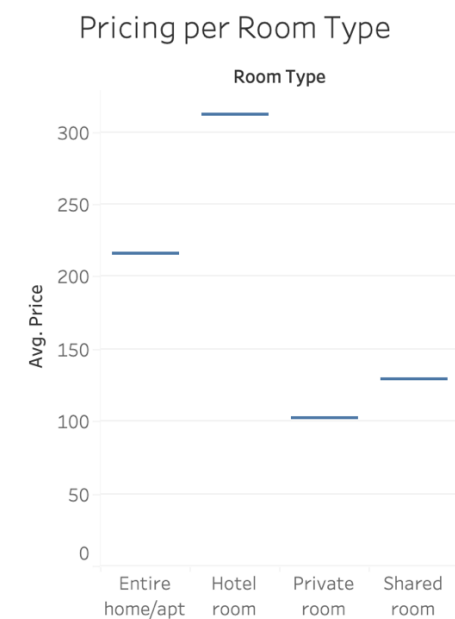


Hypothesis III: Structure of Airbnb Listings

Statement: Airbnb listings are structured to favor short-term rentals over residential housing.

- Observation: Listings often have minimum stay requirements around 30 days, with fewer available nights for expensive areas like Manhattan.
- Figures:
 - Fig 7: Average price per room type, with hotels generally being less popular despite their suitability for short-term stays.
 - Fig 8: Average stay duration for each room type, showing longer stays for entire homes/apartments.
 - Fig 9: Availability trends for different room types, highlighting that entire homes and private rooms are less available compared to hotels.

Fig 7 the average price for each room type



the average price for each room type

Fig 8 the average night stayed for each room type

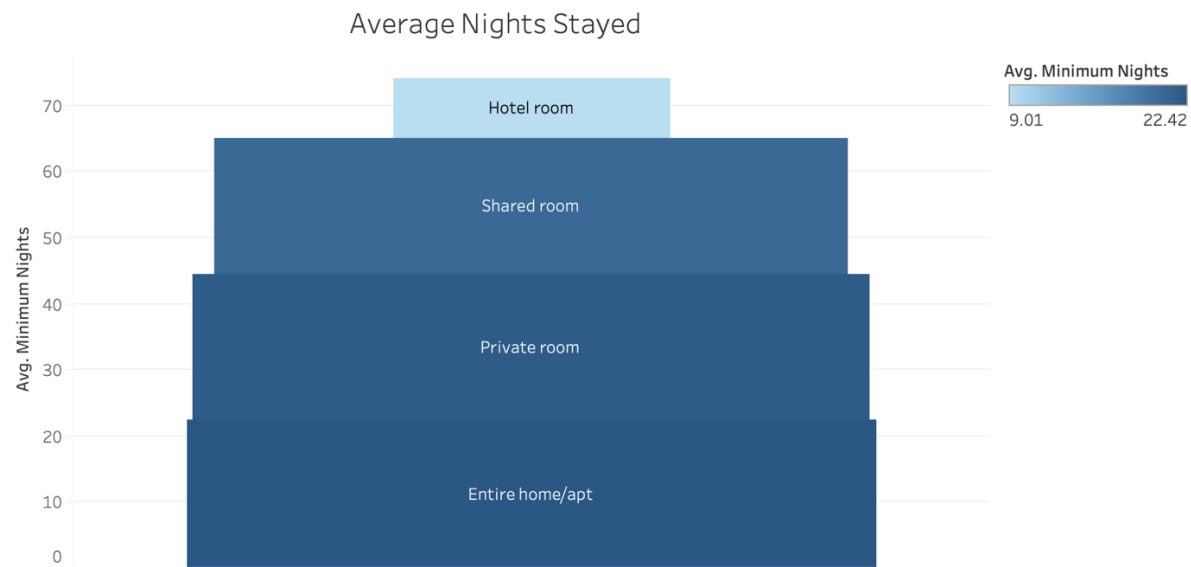
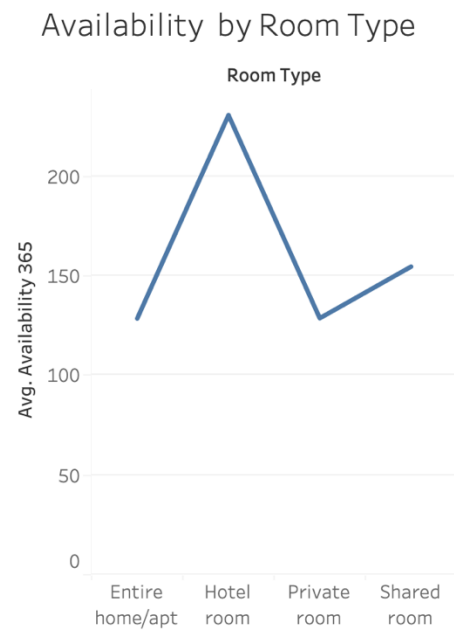


Fig 9 The trend of average of Availability [365] for Room Type.



Methods

Data Source

The dataset used for this analysis was obtained from the Inside Airbnb website, an independent non-profit organization. It includes 37,714 rows and 9 columns after data cleaning and preprocessing. Data was cleaned using OpenRefine and verified for accuracy.

Data Preprocessing

- Data Reduction: The dataset was reduced from 12 to 9 columns, excluding irrelevant columns such as id, name, last_review, and reviews_per_month.
- Data Types: Columns were converted to appropriate data types including integer, string, and float.
- Handling Missing Values: Notable columns with missing values include last_review and reviews_per_month.

Analysis Techniques

The analysis involved simple statistical methods, including classification, histograms, scatterplots, and distribution analysis.

Results

- Price Trends: Manhattan has the highest housing prices among the boroughs, with homes and private rooms being the most common types of listings.
- Minimum Stay Requirements: Expensive areas like Manhattan and Brooklyn have higher minimum night stay requirements and less availability throughout the year.
- Listing Availability: Bronx and Staten Island have more frequent rentals due to shorter minimum stay requirements, while wealthier areas have less availability and more hosts with multiple listings.

Conclusion

The analysis suggests that Airbnb has contributed to disruptions in the residential housing market in New York City, leading to reduced availability of long-term rental options for residents. The findings indicate a significant impact of Airbnb on housing supply, with a notable shift towards short-term rentals in high-demand areas.

References

Inside Airbnb. (n.d.). *Get the Data*. Retrieved from insideairbnb.com/get-the-data.html