

AIRBNB IN NYC

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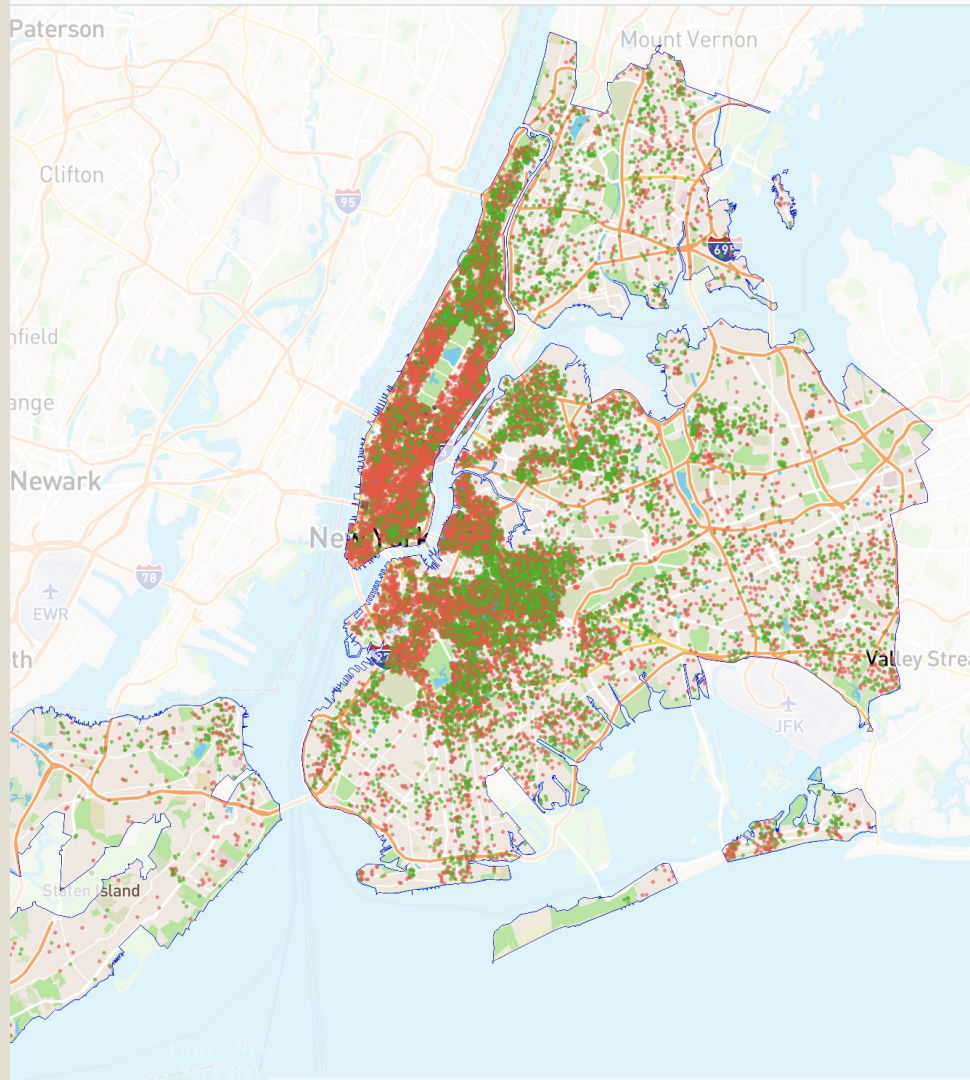
INTRO

- Subject: Airbnb prices in NYC
- Research Question: How do various factors, such as bedroom number, room type, review scores, and neighborhood, influence the price of Airbnb listings in New York City?
- Motivation: Airbnb has transformed the travel industry



Dataset

- From InsideAirbnb on March 1, 2025
- 58 variables
- 22,308 observations
- Focusing on price, bedroom number, room type, review score, and neighborhood

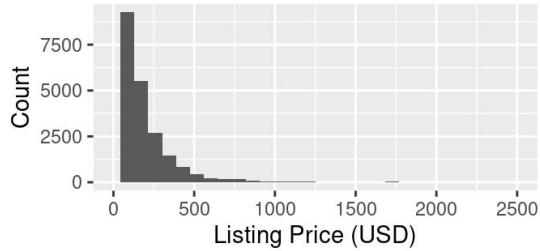


Univariate EDA

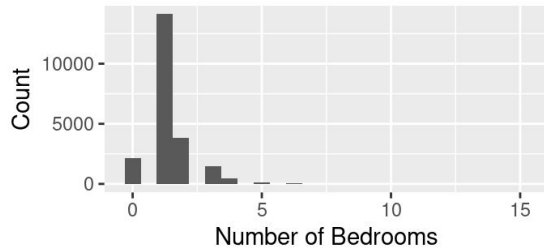
Distribution of Airbnb Prices in New York City



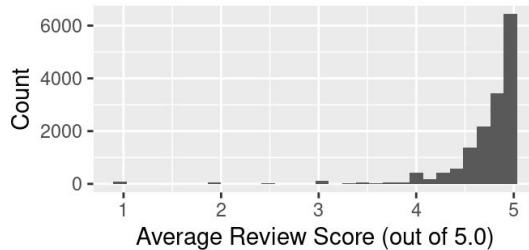
Closer Look at Distribution of Price (Removed Outliers)



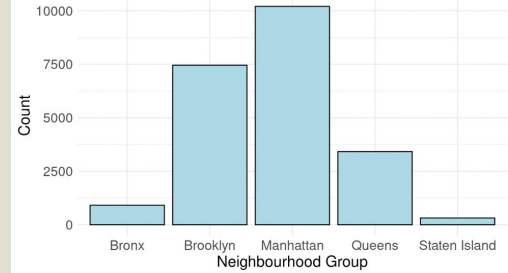
Distribution of Number of Airbnb Bedrooms in New York City



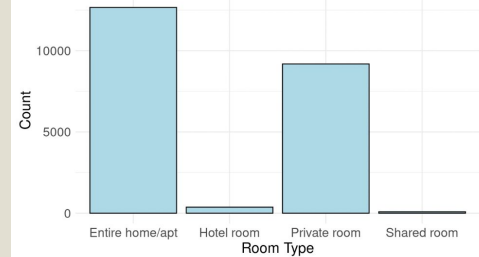
Distribution of Average Airbnb Review Scores in New York City



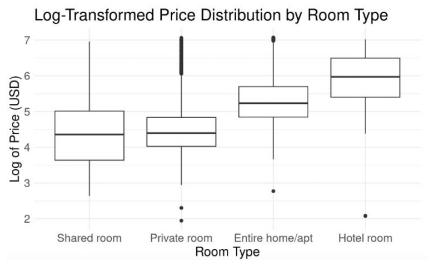
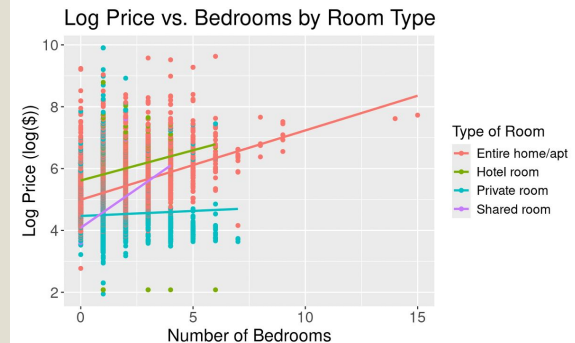
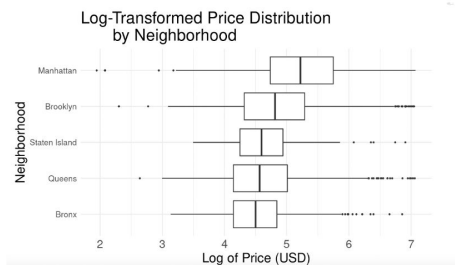
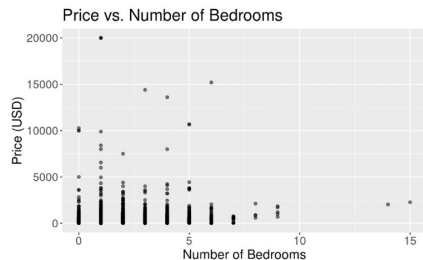
Distribution of Neighbourhood Groups



Distribution of Room Types



Bivariate EDA and Interaction Effects



Initial Modeling Strategies

- **Model Choice:** Multiple Linear Regression (MLR)

Response variable: log-transformed price

Predictors: Bedrooms, Bathrooms, Accommodation Capacity, Room Type, Review Score, Neighborhood

- **Strategies:**

Apply $\log(\text{price})$ as the response and fit multiple linear regression models with and without interaction terms

Evaluate model fit and compare models using Adjusted R^2 , residual plots, and p-values

Check assumptions: linearity, normality, homoscedasticity, independence

- **Mathematical Expression of the Model:**

$$\begin{aligned} \log(\text{Price}) = & \beta_0 + \beta_1 \cdot \text{Bedrooms} + \beta_2 \cdot \text{Bathrooms} + \beta_3 \cdot \text{Capacity} + \beta_4 \cdot \text{Review Score} + \beta_5 \cdot \text{RoomType_Private} \\ & + \beta_6 \cdot \text{RoomType_Shared} + \beta_7 \cdot \text{Neighborhood_Brooklyn} + \dots + \epsilon_i \end{aligned}$$



Next Steps

- Finalize feature selection and handle remaining missing data
- Fit and compare multiple linear regression models:
 - ❖ With vs without interaction terms
 - ❖ Evaluate using Adjusted R^2 , residual plots, p-values
- Conduct full assumption checks (linearity, homoscedasticity, normality, independence)
- Investigate multicollinearity and consider dropping or combining correlated predictors if necessary

