



Pricing \$tays in NYC for Ho\$t\$

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Objective



Price

- Too high → loss
- Too low → loss



Features

- Property
- Listing



Regression Model

- Reasonable price



Workflow

Web Scraping

BeautifulSoup

Selenium

Data Cleaning & EDA



Regression



Prediction/Evaluation

Target:
Price per night

\$70 / night

★ 4.60 (5)

CHECK-IN
Add date

CHECKOUT
Add date

GUESTS
1 guest

Check availability



Data

SUPERHOST

Private room in Midtown
Near Empire State Building Entire Place Is Yours

2 guests · 2 bedrooms · 3 beds · 1 private bath
Wifi · Air conditioning · Kitchen · Heating

★ 4.94 (16 reviews)

\$279 \$221 / night
\$1,934 total

Hotel room in Manhattan
Freehand New York - Queen Room

2 guests · 1 bedroom · 1 bed · 1 bath
Wifi · Air conditioning · Heating

★ 4.56 (174 reviews)

\$176 / night
\$1,229 total

Entire rental unit in Midtown
Sky High NYC Apartment Stunning Views

2 guests · 1 bedroom · 1 bed · 1 bath
Wifi · Air conditioning · Kitchen · Heating



★ 4.65 · 554 reviews

Cleanliness



Communication



Check-in





Modelling

Validation R² Scores

Simple linear regression with numeric features

Baseline
0.290

+ Property Type
0.407

+ Borough
0.522

+ Superhost
0.522

+ Deviation Feature: No. guests relative to borough

0.530

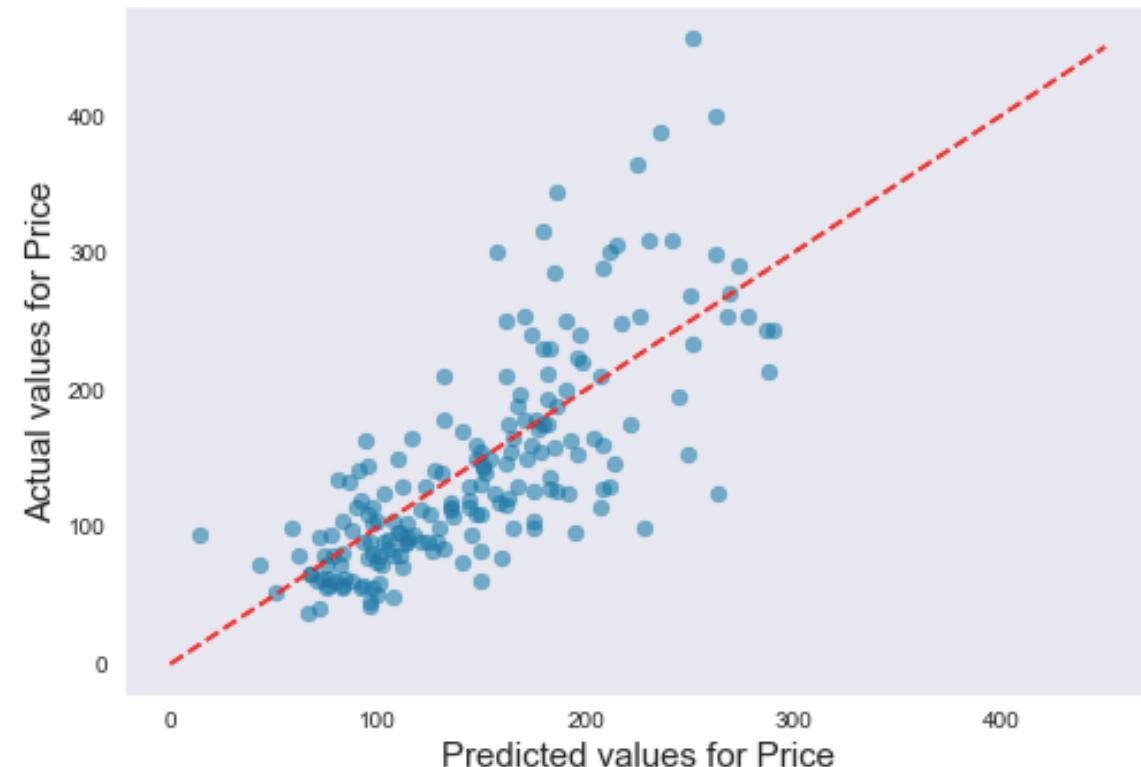
RidgeCV
0.526

LassoCV
0.534

- Underfitting at each step
- Keep adding complexity

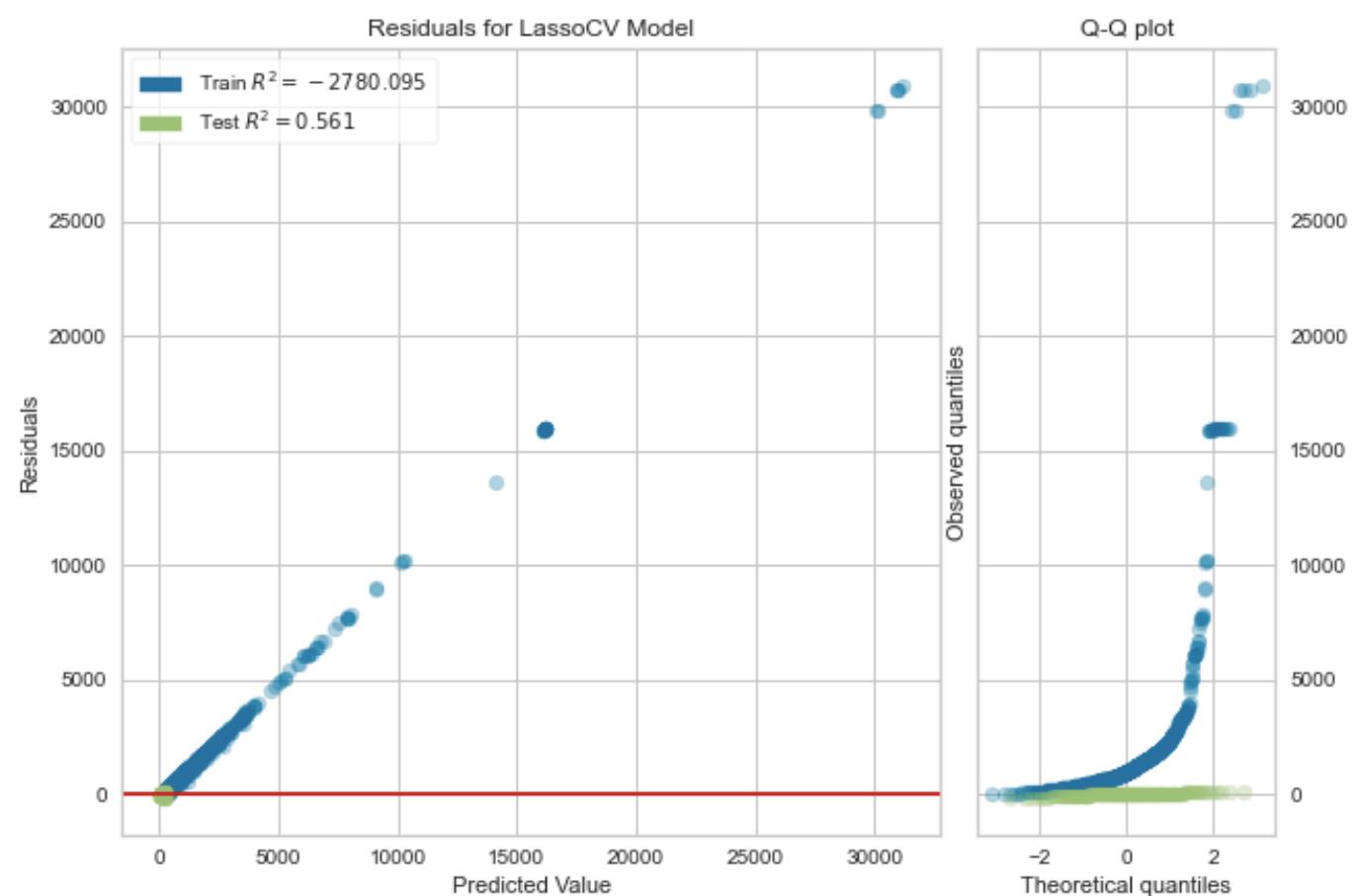
Final Model Performance

Predicted vs Actual Price



R² on Holdout: 0.561
MAE: \$38.47

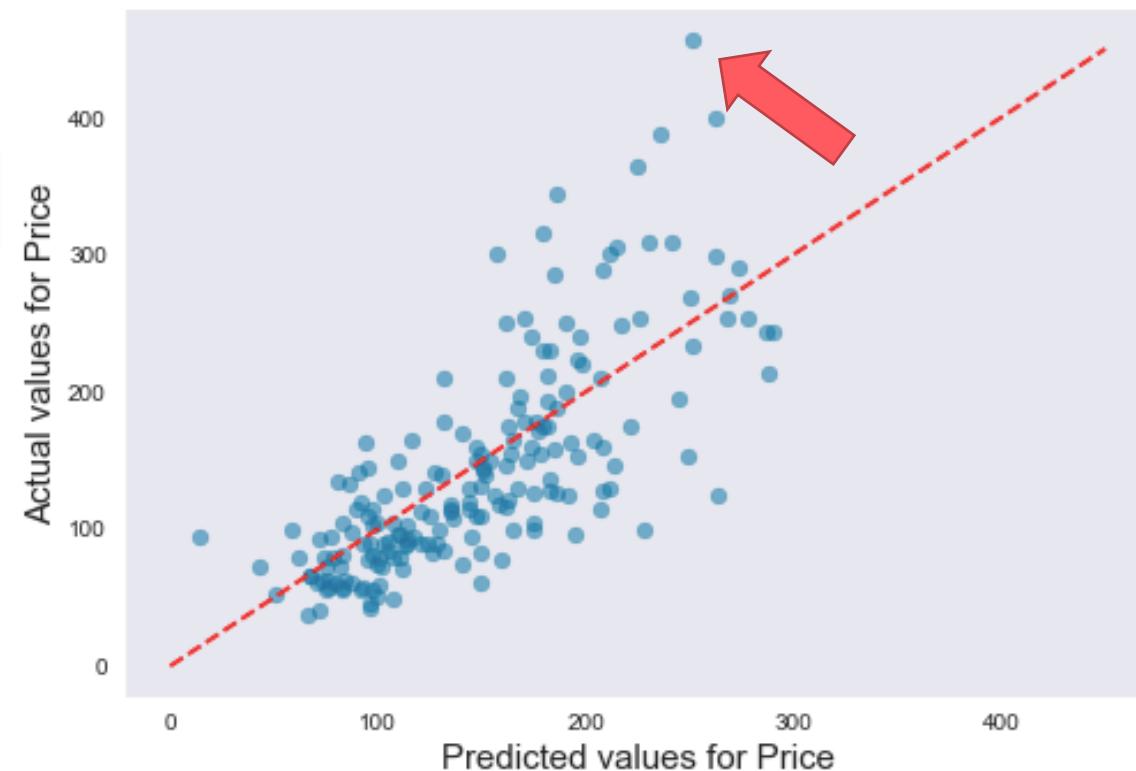
heteroskedasticity





Final Model Performance

Predicted vs Actual Price



Actual: \$456.00/night
Prediction: \$250.84/night
-\$205

MAE: \$38.47

Heart of Midtown One-Bedroom for Family

★ 4.88 (16 reviews) · Superhost · New York, United States

Share Save



Entire rental unit hosted by Henry

8 guests · 1 bedroom · 4 beds · 1 bathroom



₹22,012 / night

★ 4.88 (16 reviews)

CHECK-IN
Add date

CHECKOUT
Add date

GUESTS
1 guest

Check availability

Report this listing

Entire home

You'll have the flat to yourself.

Enhanced Clean

This host has committed to Airbnb's 5-step enhanced cleaning process. [Show more](#)

Self check-in

You can check in with the doorman.

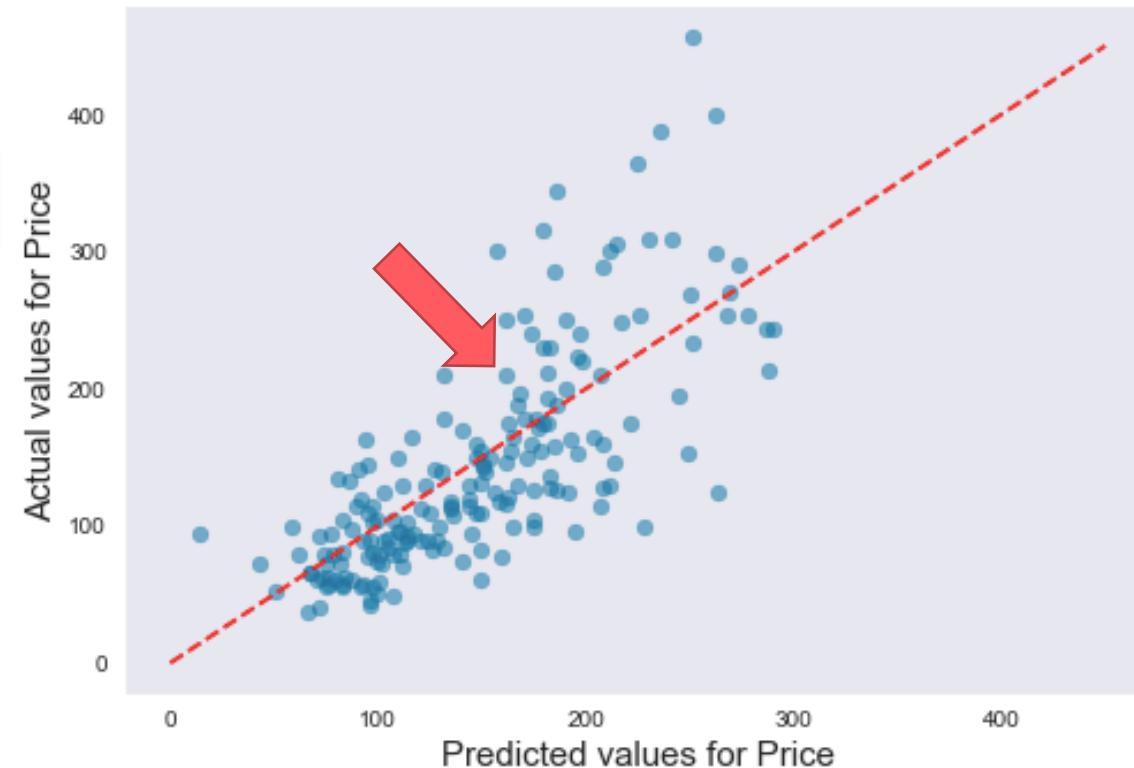
Henry is a Superhost

Superhosts are experienced, highly rated hosts who are committed to providing great stays for their guests.



Final Model Performance

Predicted vs Actual Price



Actual: \$194.00/night
Prediction: \$180.93/night

-\$13

Queens Modern Apartment with WiFi!

★ 4.91 (46 reviews) · Superhost · Queens, New York, United States

Share Save



Entire rental unit hosted by Winston

5 guests · 2 bedrooms · 3 beds · 1 bath



\$190 / night

★ 4.91 (46 reviews)

CHECK-IN
Add date

CHECKOUT
Add date

GUESTS
1 guest

Check availability

Report this listing

Entire home
You'll have the apartment to yourself.

Enhanced Clean
This host committed to Airbnb's 5-step enhanced cleaning process. [Show more](#)

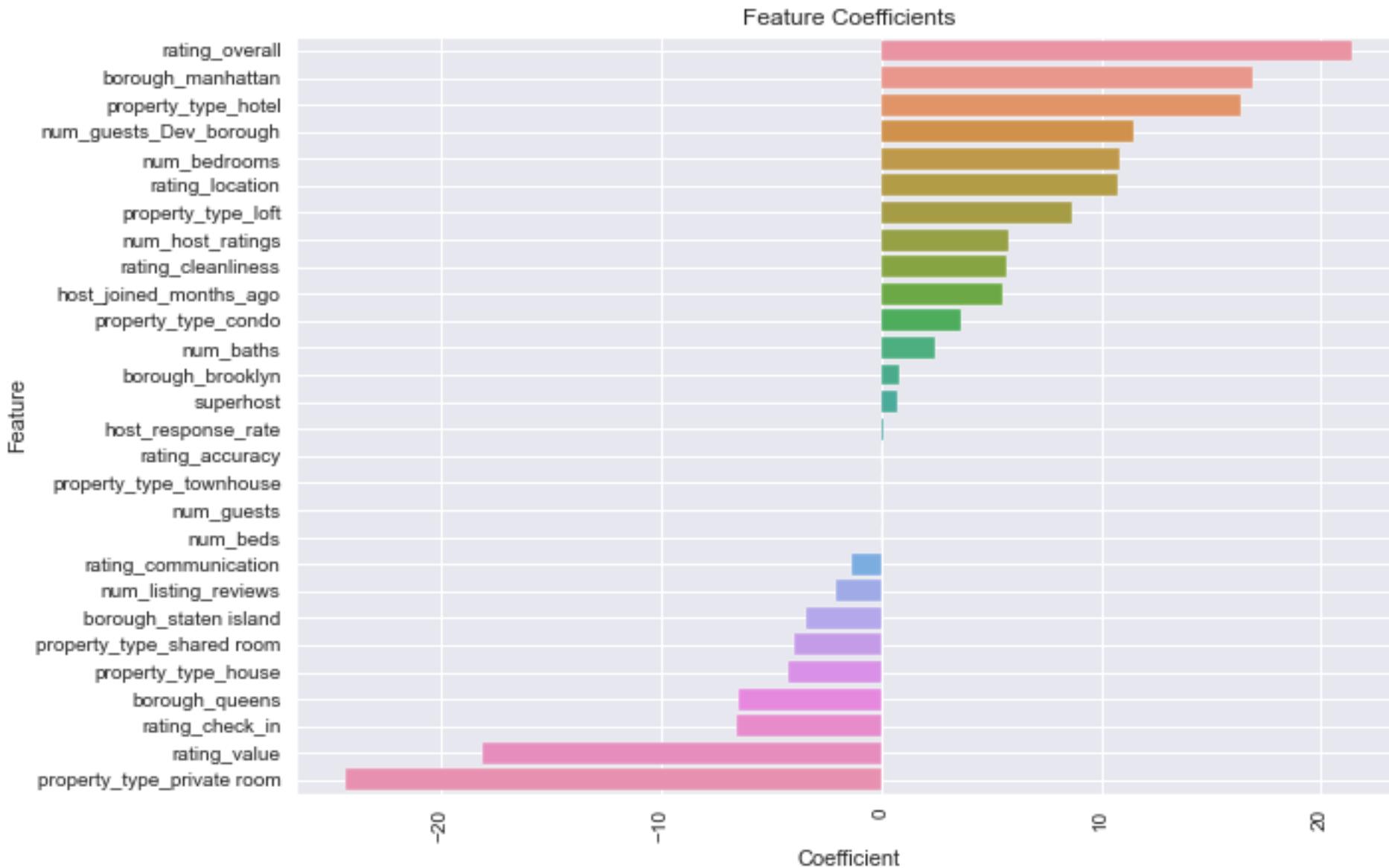
Winston is a Superhost
Superhosts are experienced, highly rated hosts who are committed to providing great stays for guests.

Great check-in experience
90% of recent guests gave the check-in process a 5-star rating.

MAE: \$38.47



Importance of Features





Future Work



**Feature
Engineering**



**Time
Series
Analysis**

Seasonality



NLP

Sentiments of
reviews

Thank you!

Questions?

Appendix





Features

Numeric

- Ratings
 - Overall, cleanliness, accuracy, communication, location, check-in, value
- Host
 - Number of host ratings, host joined months ago, host response rate
- Number of listing reviews
- Size
 - Number of guests, number of bedrooms, number of beds, number of baths

Categorical

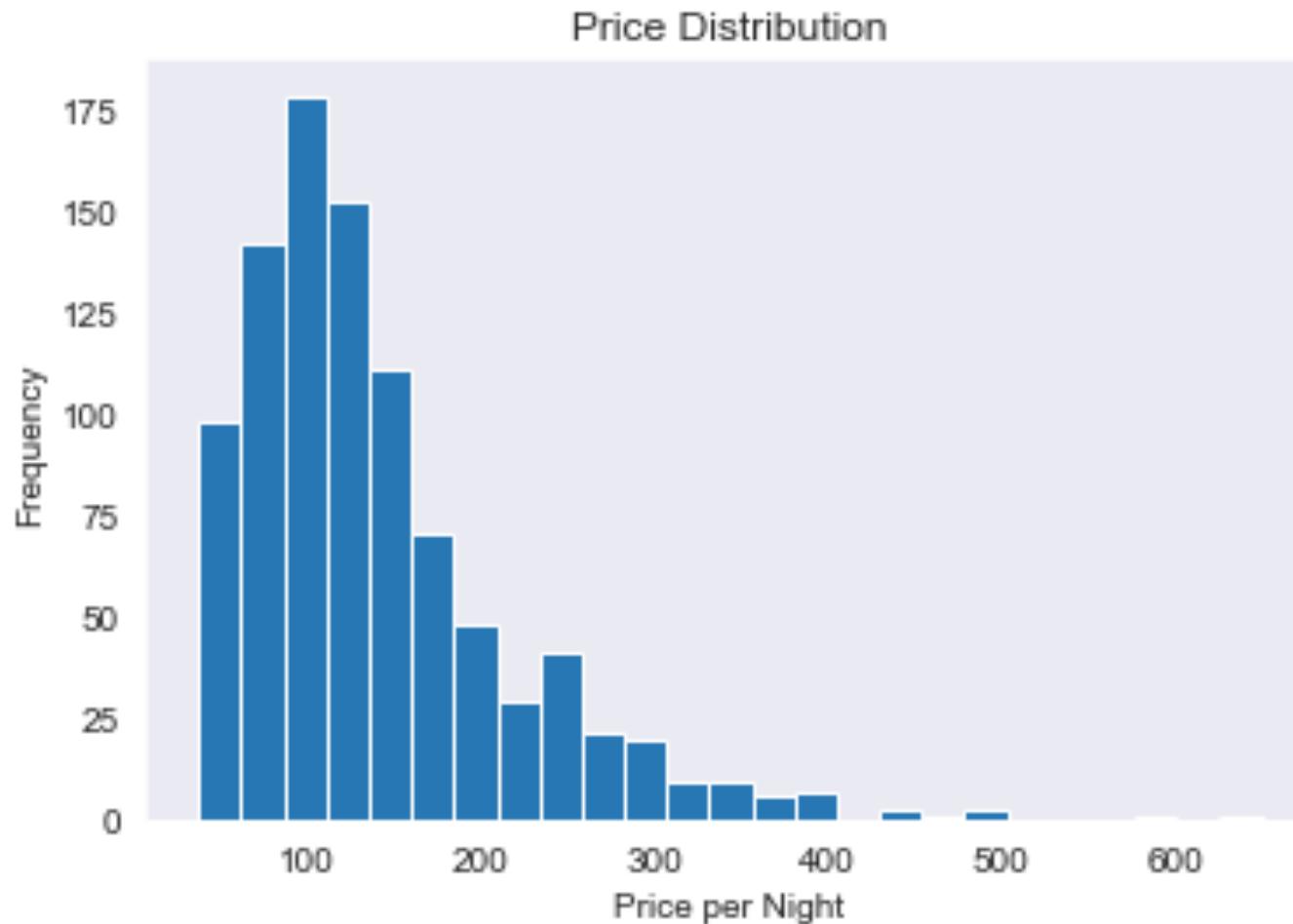
- Borough
 - Manhattan, Bronx, Brooklyn, Queens, Staten Island
- Property Type
 - Apartment, condo, hotel, house, loft, private room, shared room, townhouse
- Superhost

Engineered

- Deviation Feature
 - Number of guests (occupancy) relative to borough



Target Distribution



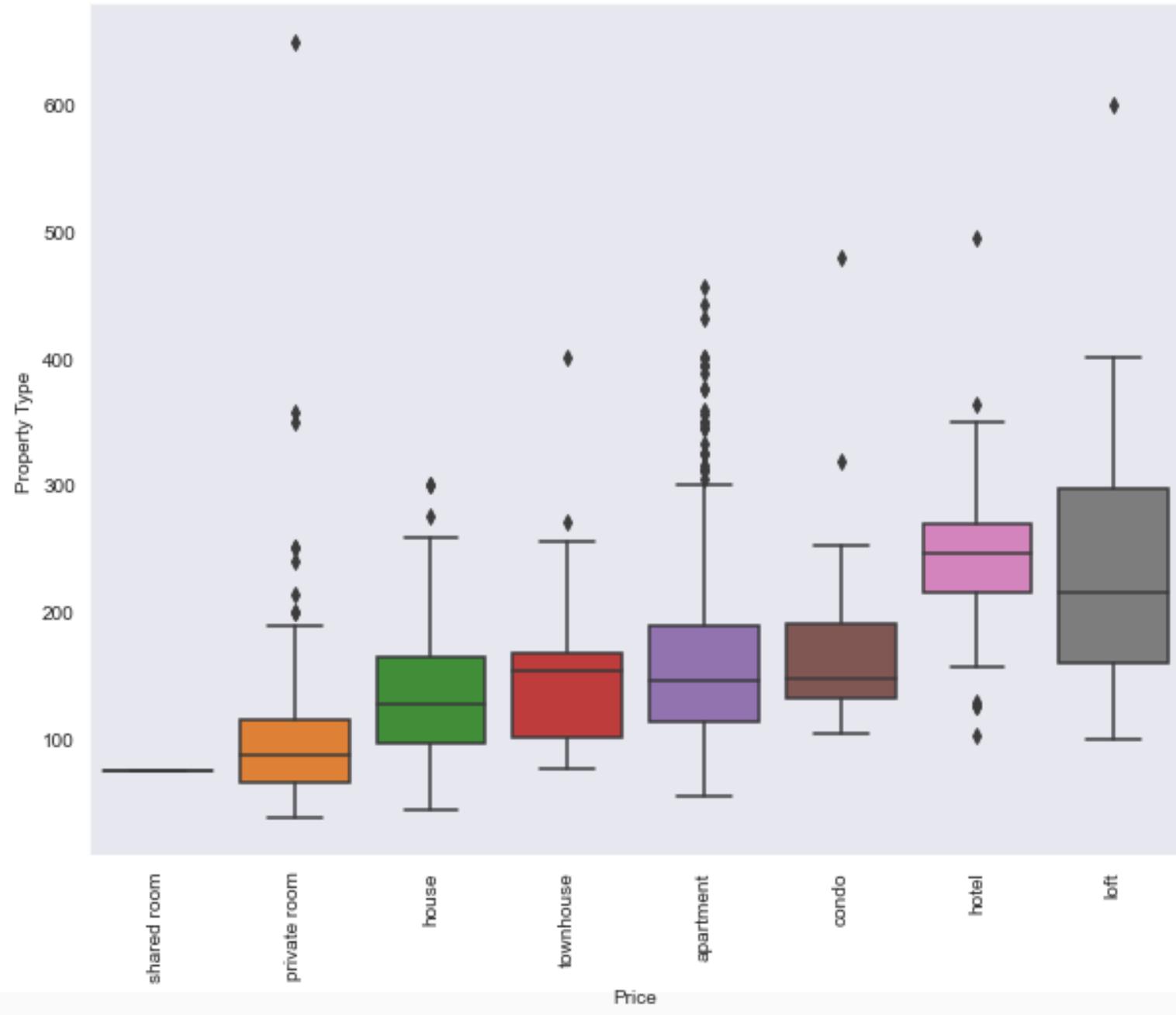


Target Distribution



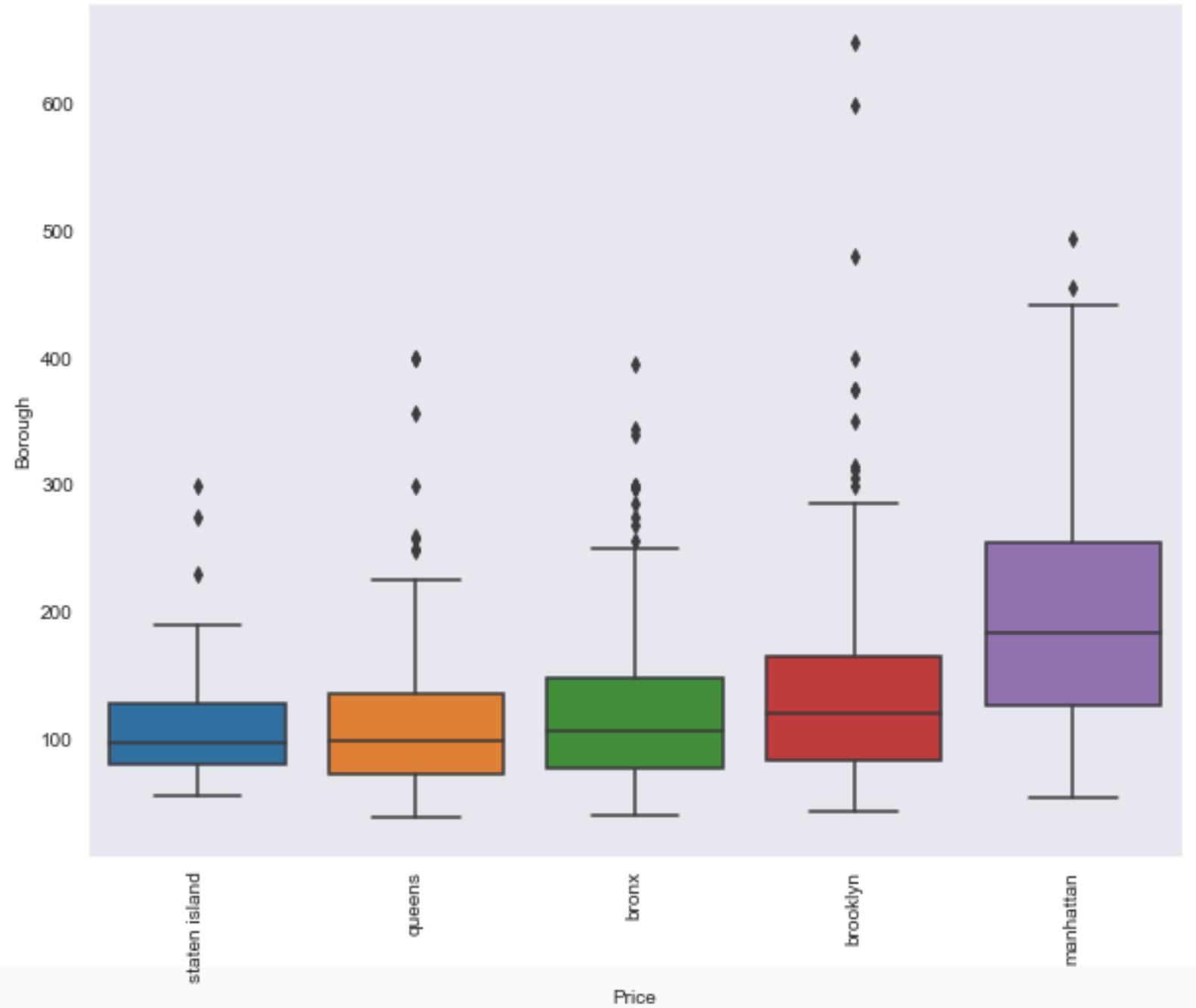


Correlation between Property Type and Price



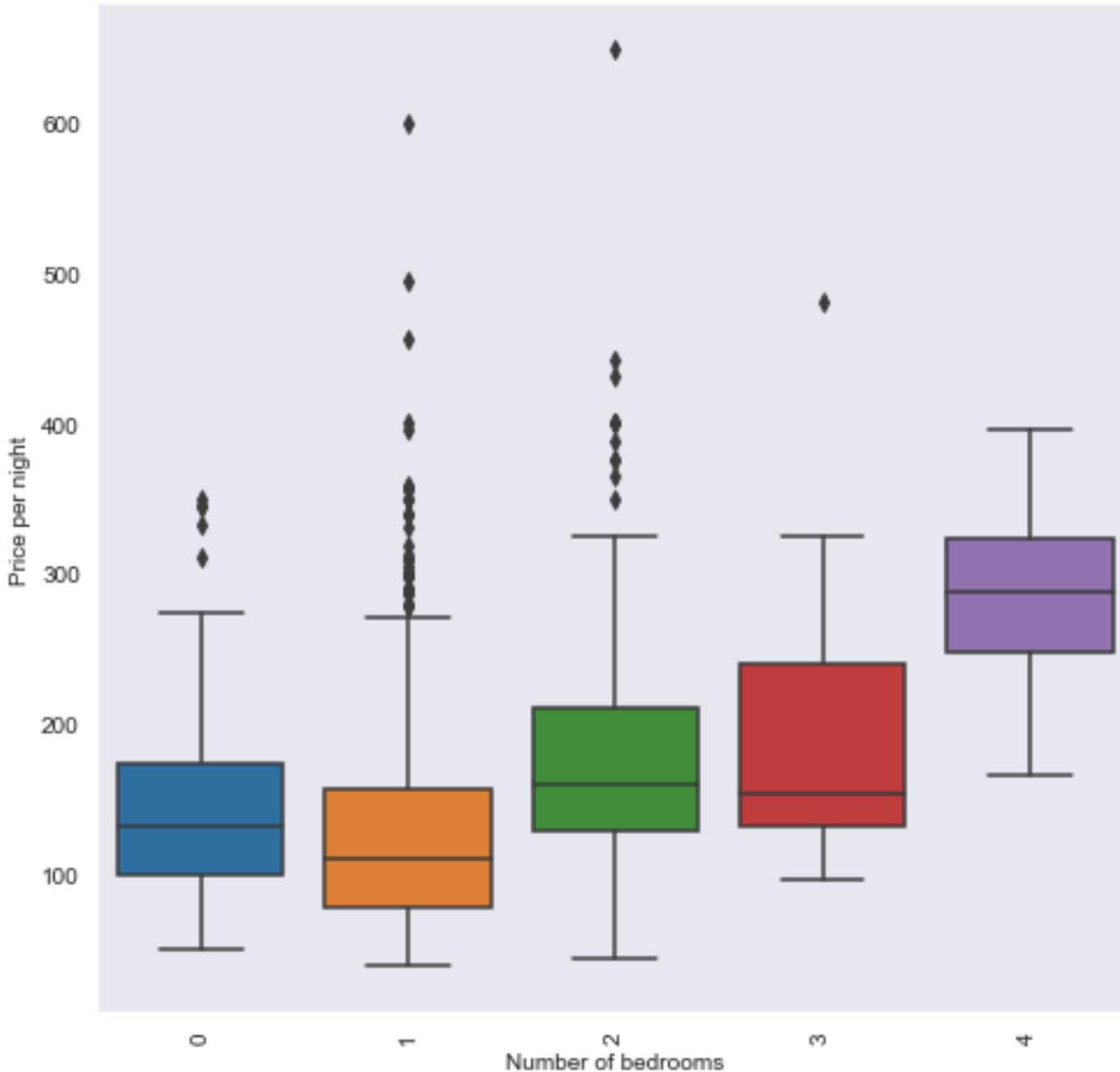


Correlation between borough and price



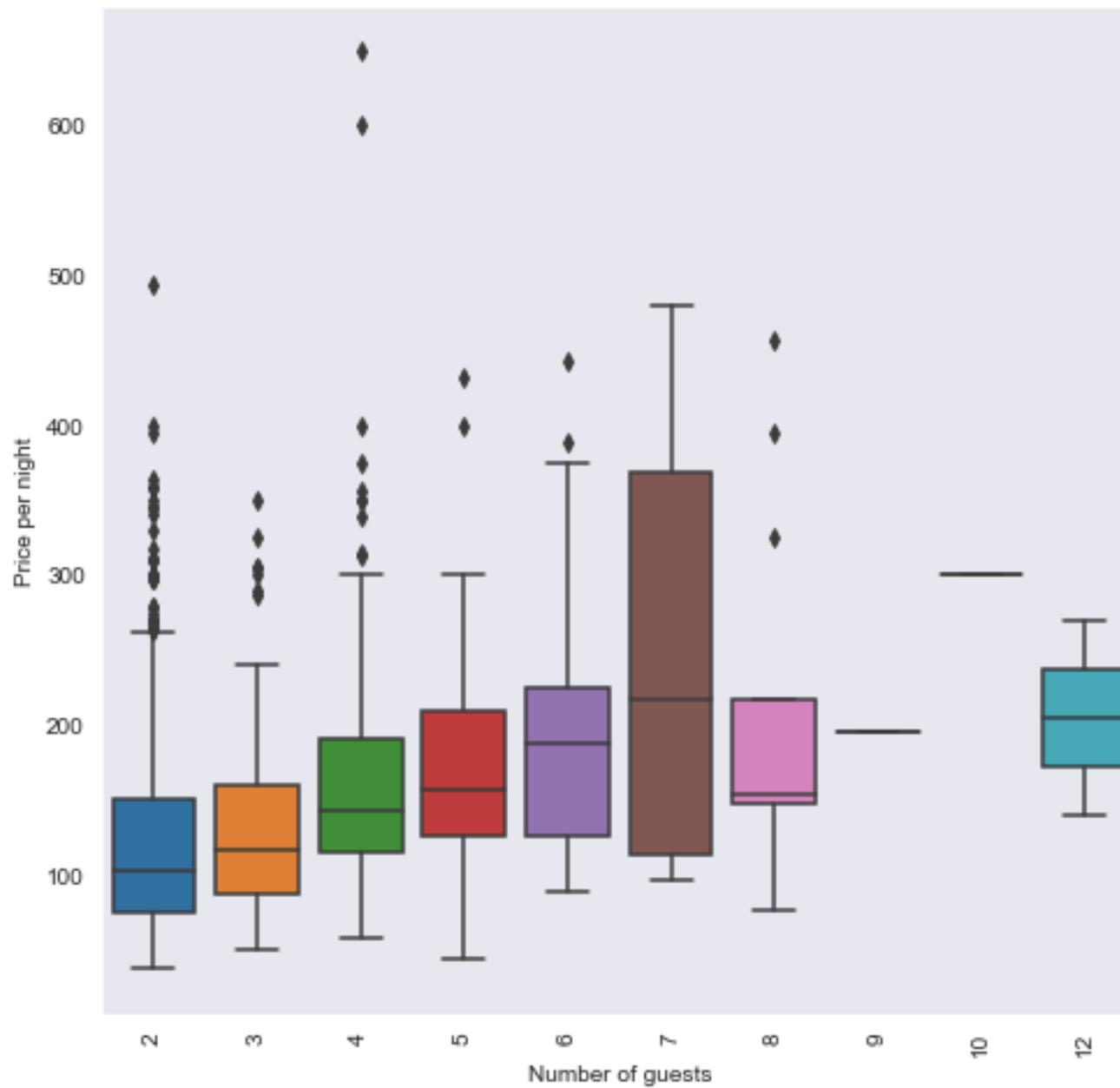


Correlation between Number of Bedrooms and Price/night





Correlation between Occupancy and Price/night





Correlations between dataset's numeric features

