

MEMORANDUM

To: Carole Voulgaris, Course Instructor, SES 5215

From: Chunfeng Yang, Student, SES 5215

Date: November 20, 2022

Subject: Assignment 5, Multiple regression

The purpose of this memo is to present the results of a linear regression model that addresses the question:

What is the effect of the distance to an Airbnb's nearest gallery on its listing price for each night, after accounting for the effects of the distance to the nearest subway station and room type in Manhattan, New York?

I will be addressing this question using Airbnb listing data from a mission-driven project "Inside Airbnb" (<http://insideairbnb.com/explore/>) and public amenities data from NYC OpenData (<https://data.cityofnewyork.us/Transportation/Subway-Stations/arq3-7z49>). My dataset includes 21,598 Airbnb listings in Manhattan, New York.

The variables in my data set are:

1. The listing price of an Airbnb listing (outcome): the expense of one night stay in an Airbnb listing, in USD.
2. Vicinity of the gallery (predictor): The distance from one Airbnb listing to its nearest gallery.
3. Vicinity of the subway Station (predictor): The distance from one Airbnb listing to its nearest subway station.
4. Room Type (predictor): A categorical variable representing the types of Airbnb listing.
*Inside my categorical variable Room Type, I choose Entire Home/Apartment as my reference category.

I estimated a linear regression model predicting the listing price of an Airbnb based on its distance to the nearest gallery, its distance to the nearest subway station, and room types. The results are shown in Table 1. The model has an R-squared value of 0.15, indicating that about fifteen percent of the variation in listing price can be explained by variation in the airbnb's distance to its nearest gallery, subway station, and room type. The coefficient for an Airbnb's distance to its nearest gallery is more than ten times of the coefficient for an Airbnb's distance to its nearest subway station, so we can conclude that the airbnb's listing price associates more with the distance to its nearest gallery than to its nearest subway station.

Table 1: Regression results

Variable	Coefficient estimate	p-value
Distance to its nearest gallery	-0.073	<2e-16
Distance to its nearest subway station	-0.007	0.116
Room type		
Private room	-113.000	<2e-16
Shared room	-136.600	<2e-16