

Subway and Taxi Usage in New York City and Chicago

Transportation-Transformation

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Goal

Examine relationship between public transportation and private ridership

Hypothesis

With New York and Chicago as our areas of focus, we hypothesize that greater taxi use is result of less subway stations, lower subway usage, higher population, and higher average household income per zip code.

Data Collection

- Sources are government sites
- Datasets for Chicago and NYC
- Each row is a zip code in that city and columns include:
 - Number of subway rides in that zip code in 2019
 - Number of taxi rides in that zip code in 2019
 - Population of zip code in 2010
 - Average income of zip code in 2010

Challenges

- Matching each subway station and taxi pickup/dropoff latitude/longitude location to the nearest zip code
- Scale of data: NYC subway ride number in billions while Chicago subway ride number in the millions
- Outliers: 5 zip codes in Chicago have unusually high taxi ride record

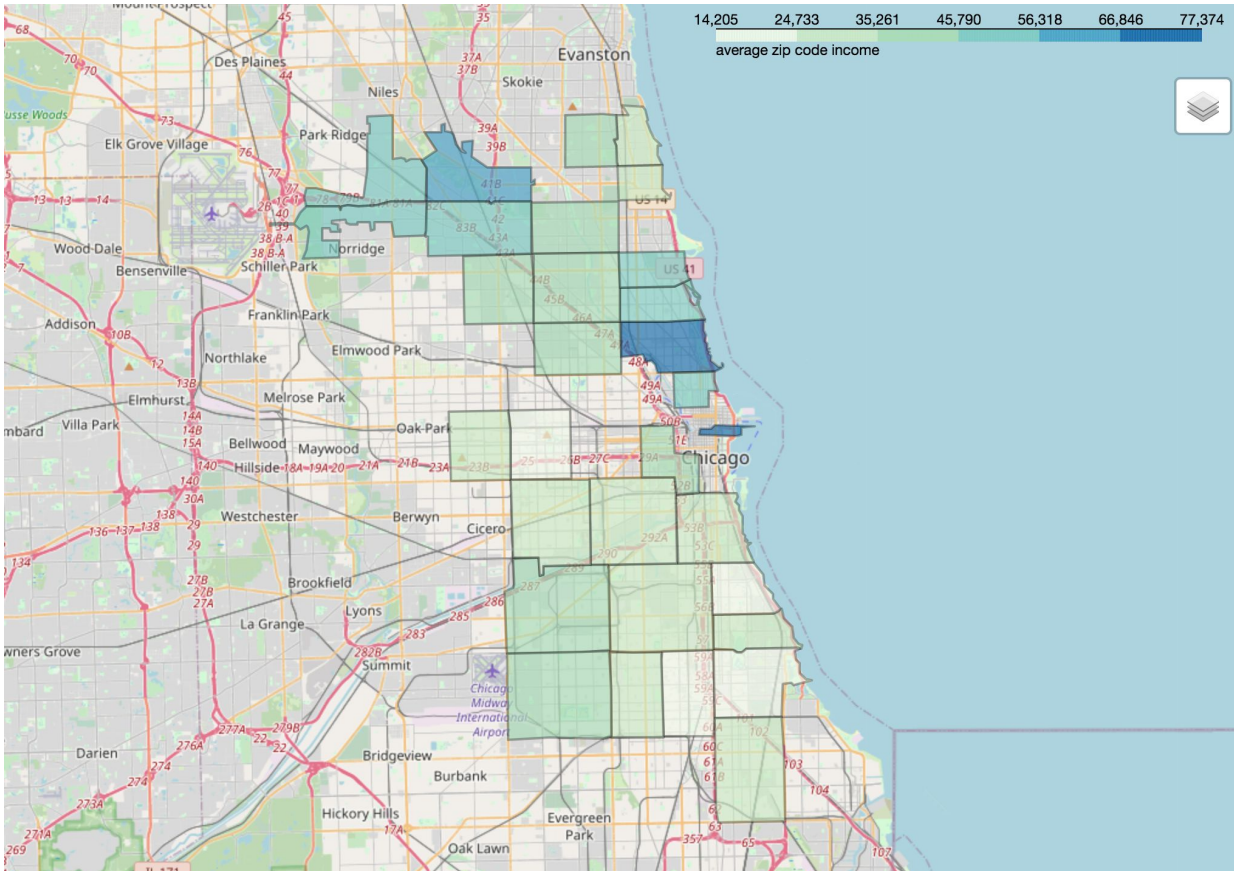


Figure 1. Avg. household income by Chicago by zip code

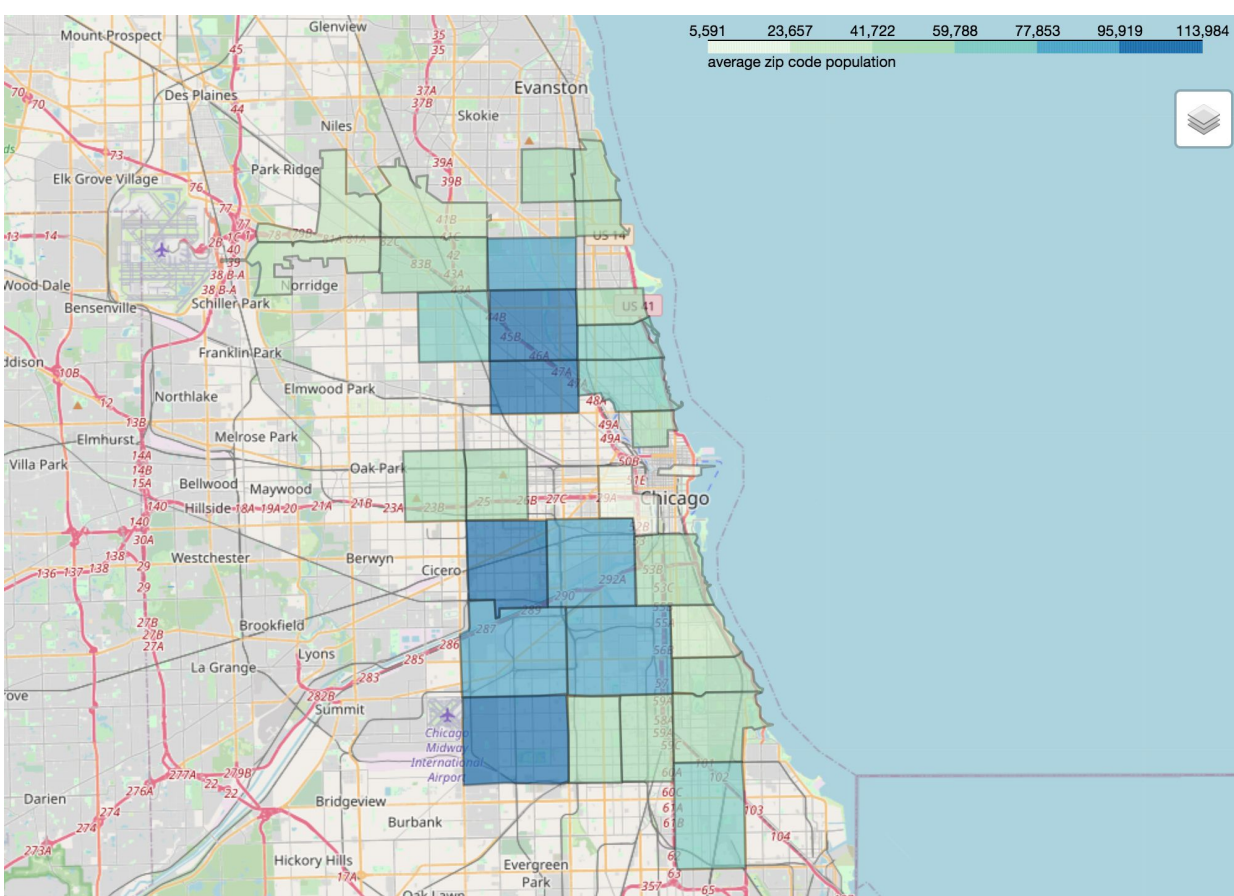


Figure 2. Population by zip code in Chicago

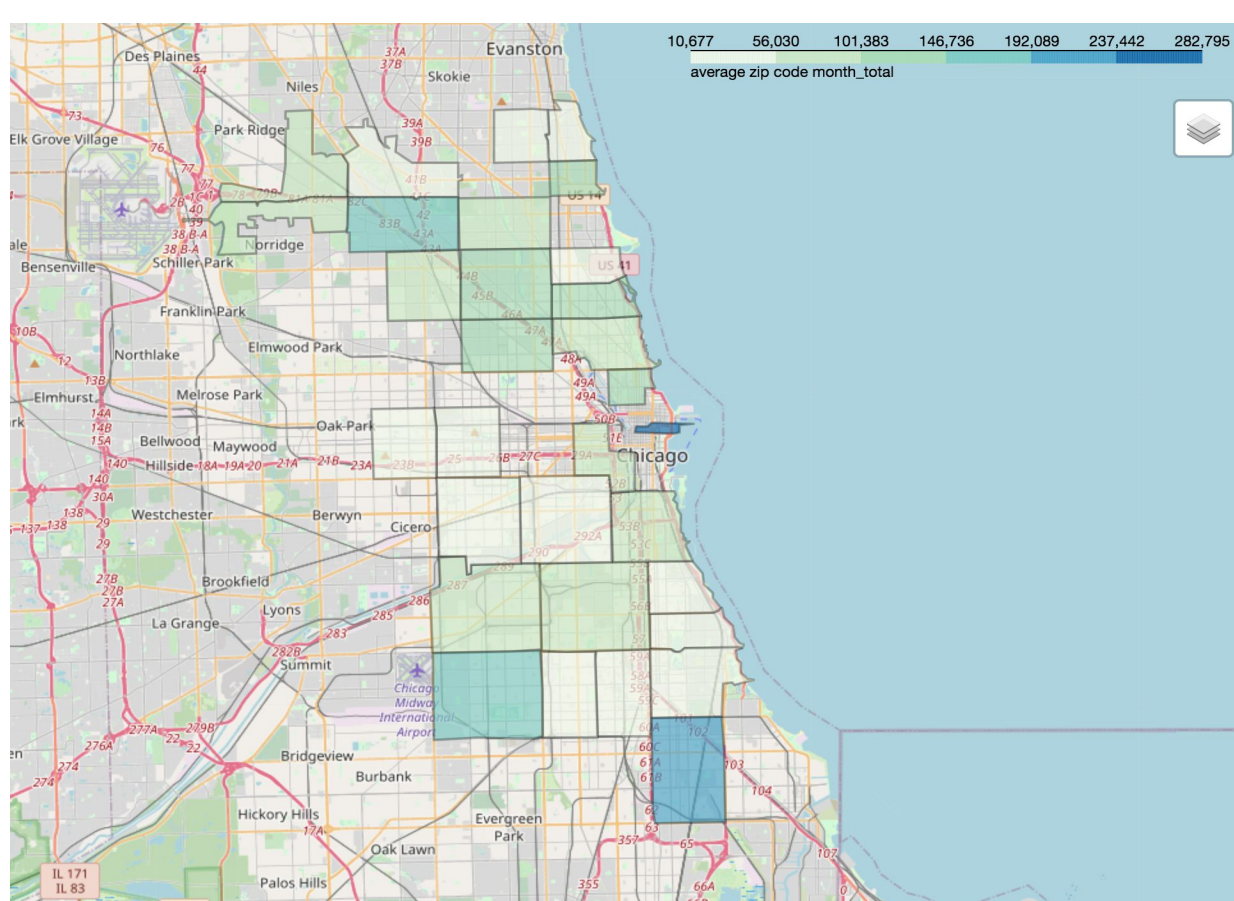


Figure 3. Monthly subway ridership in Chicago by zip code

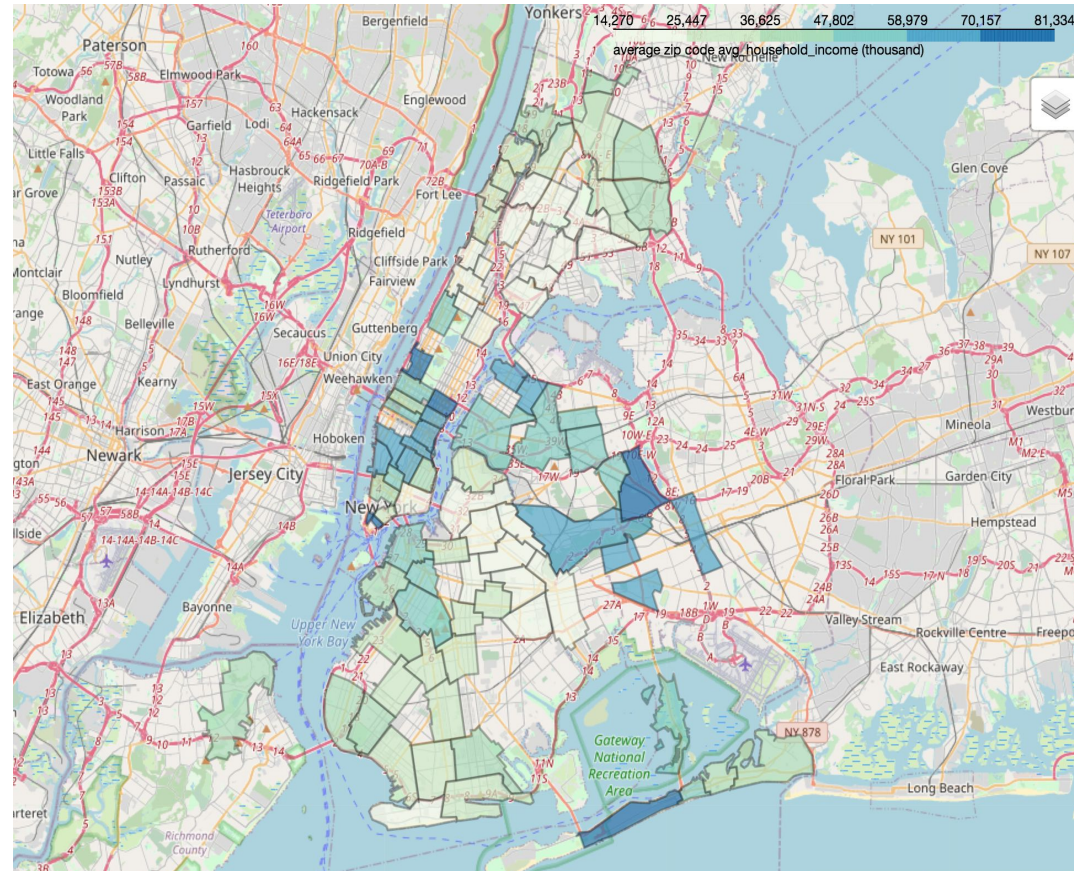


Figure 4. Average household income by NYC zip code

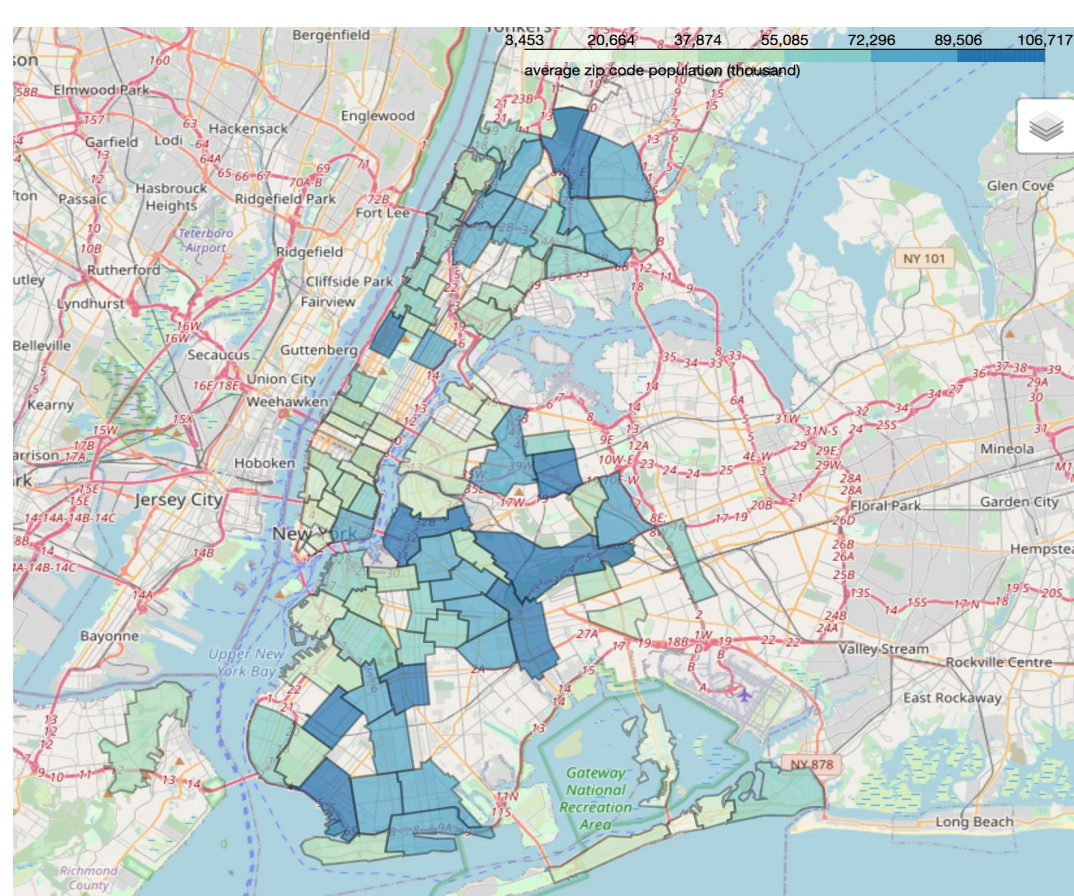


Figure 4. Population by zip code in NYC

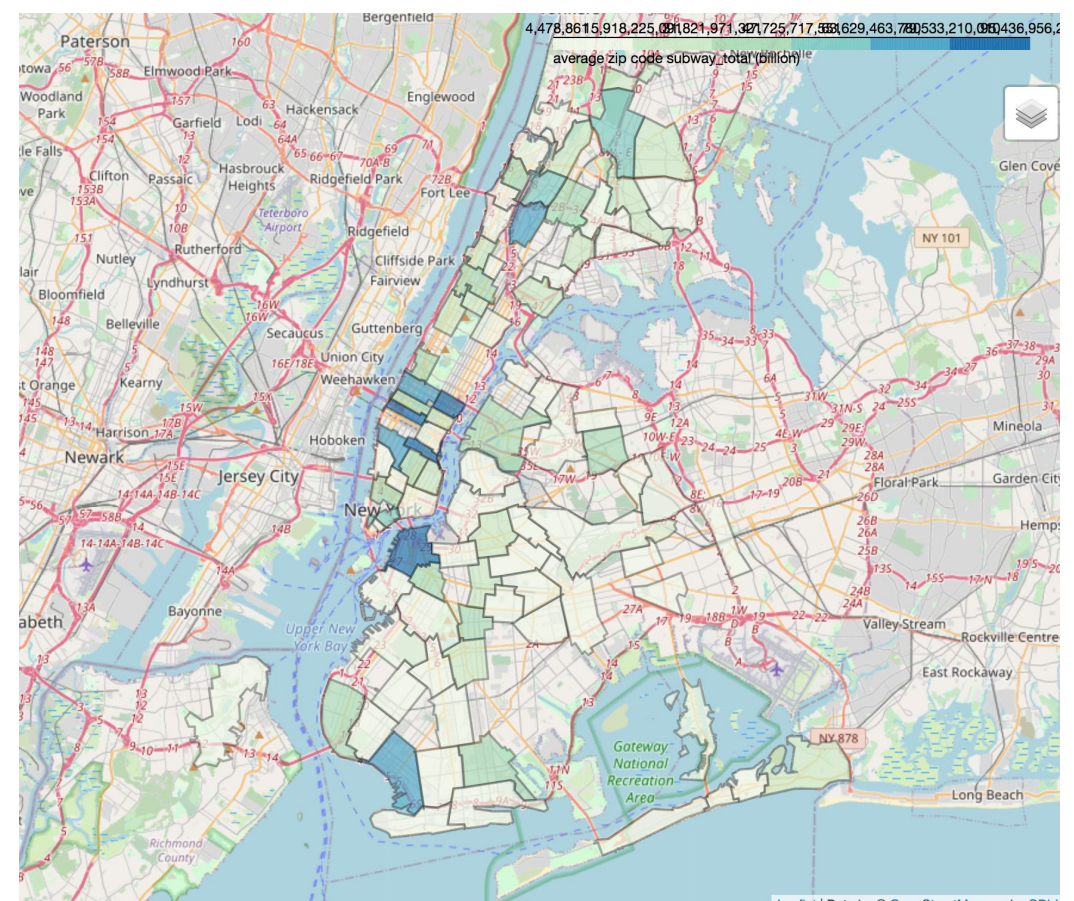
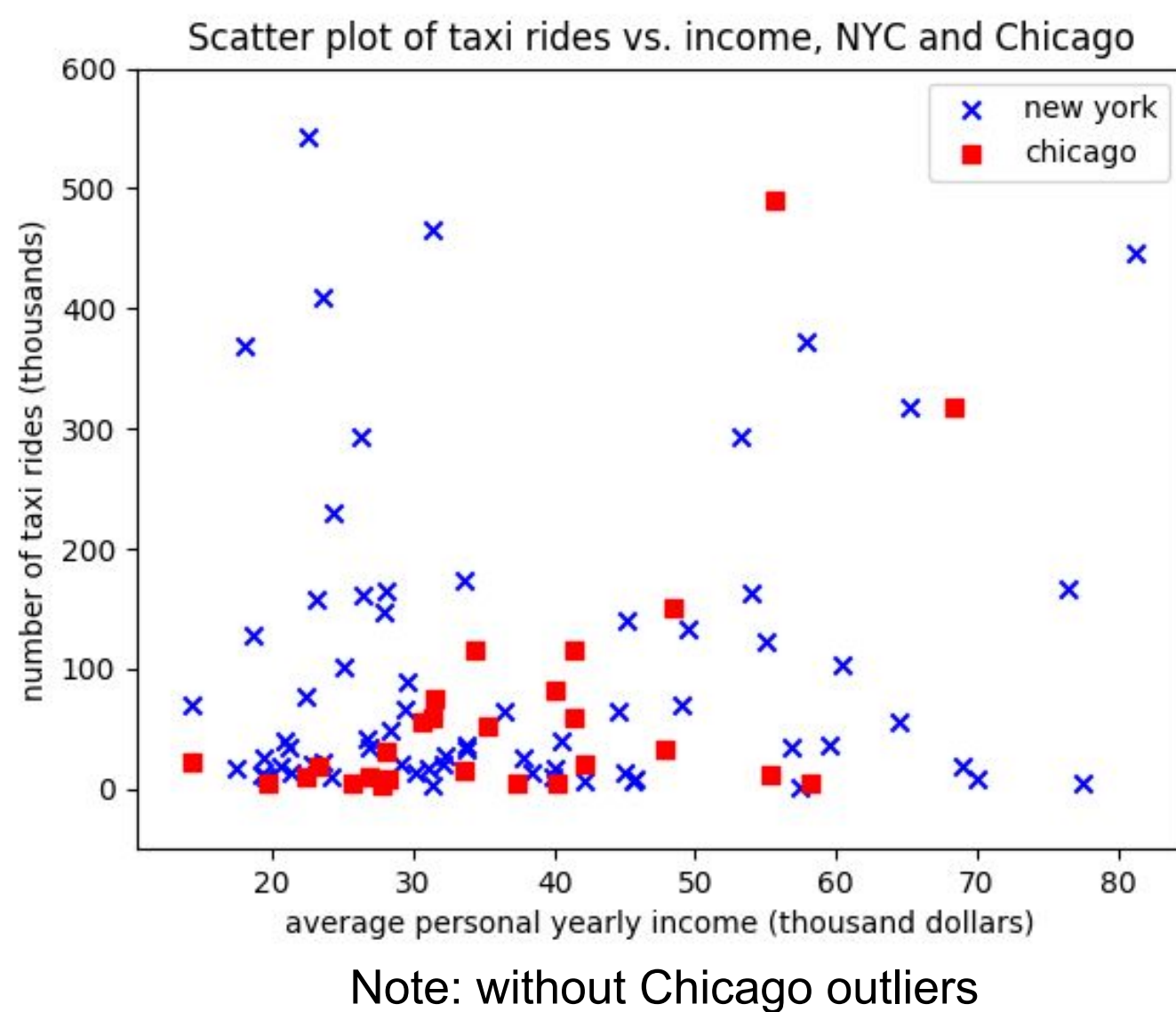
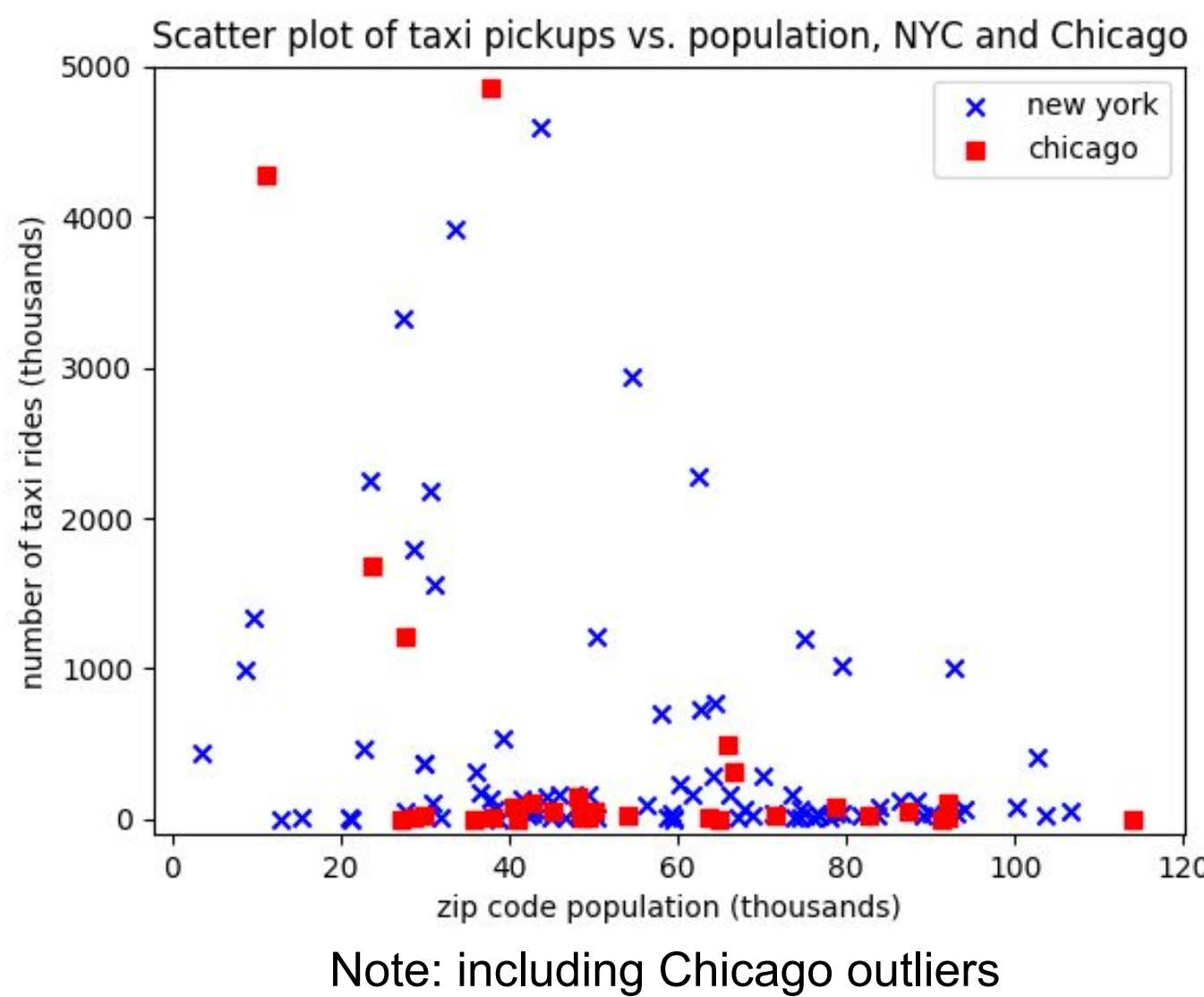


Figure 6. Monthly subway ridership by zip code in NYC

Methodology

- Simple regressions with each independent variable on each city's dataset
- Multiple regression for each city dataset
- Multiple regression on combined data of both cities



Results

variable	coefficient	p
# of subway rides	1.302e-05	0.000
income	22.8417	0.000
population	-8.3398	0.000
# of subway stations	-53.4154	0.158
city indicator	137.0224	0.476

Results for multiple regression on combined dataset of both cities

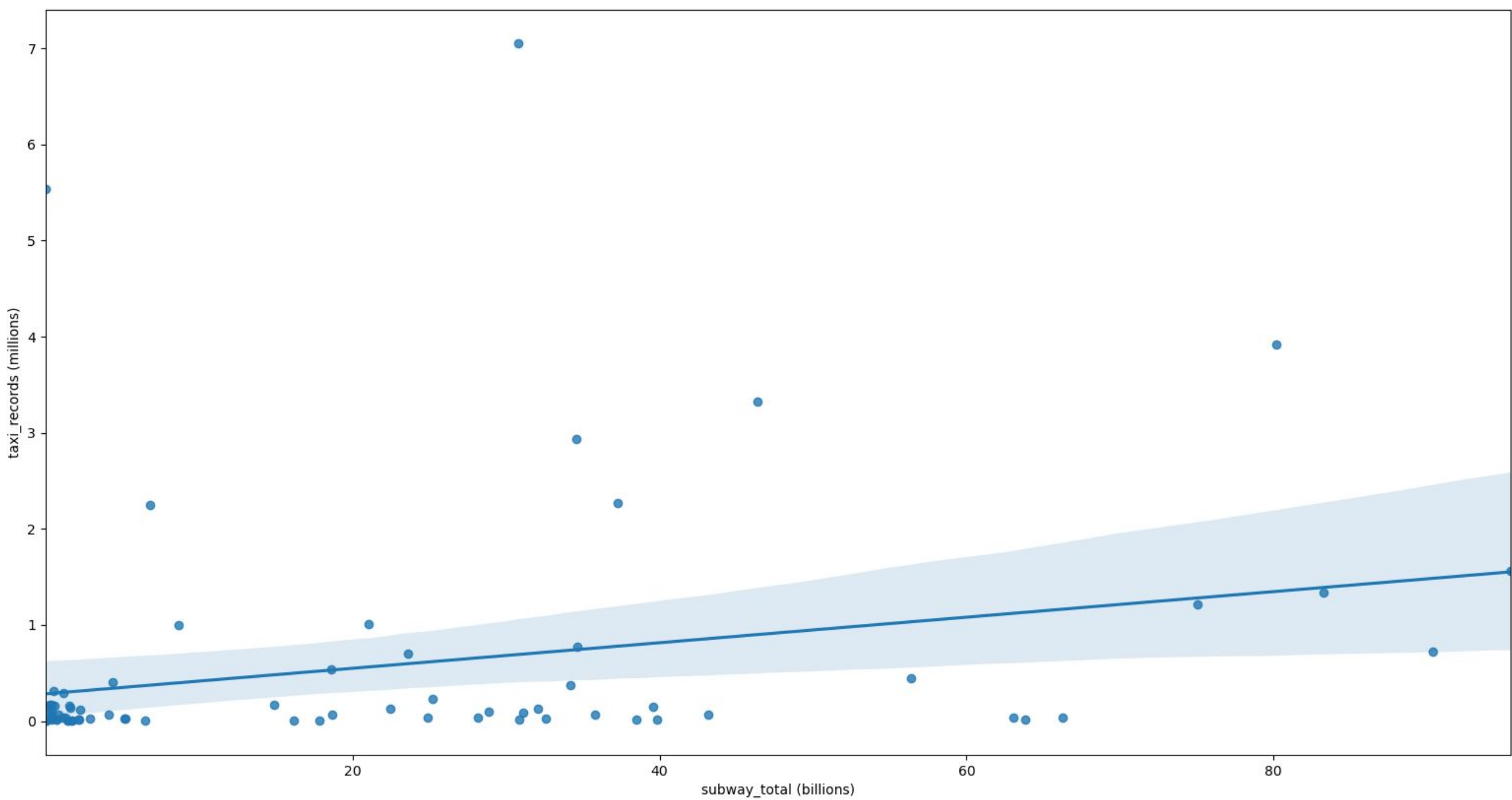


Figure 5. Relationship between the taxi ride dropoffs and the subway rides per zip code in New York City

Contributions

- Contrary to our expectations, greater subway usage and lower population correspond to greater taxi usage across both cities.
- Higher income corresponds to greater taxi usage in both cities
- For ridesharing apps: locations & route recommendation
- For infrastructure development: improved infrastructure may improve subway utilization
- Future work: details of a neighborhood (access to entertainment, tourist attractions) and how it affects taxi rides.