How UBER is Creating New Ride Sharing Markets In NYC

Citadel Datathon
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Jay Shah, Paige McKenzie, Lynn Zhu, Jack Duryea

Topic Question

- Is Uber's competition with taxis purely cannibalistic in nature, or is Uber actually increasing the number of people using for-hire vehicles?

Executive Summary

- Using trip data from Uber, yellow cabs, and green cabs in NYC during 2014 and 2015, we have shown that Uber is servicing areas that were previously neglected by taxis and, consequently, is increasing the market for FHV and providing a necessary public service to NYC citizens.

- Additionally, we have shown that the areas with highest growth in demand for rides-for-hire after Uber's entry have lower than average income, suggesting that Uber is a more affordable option.

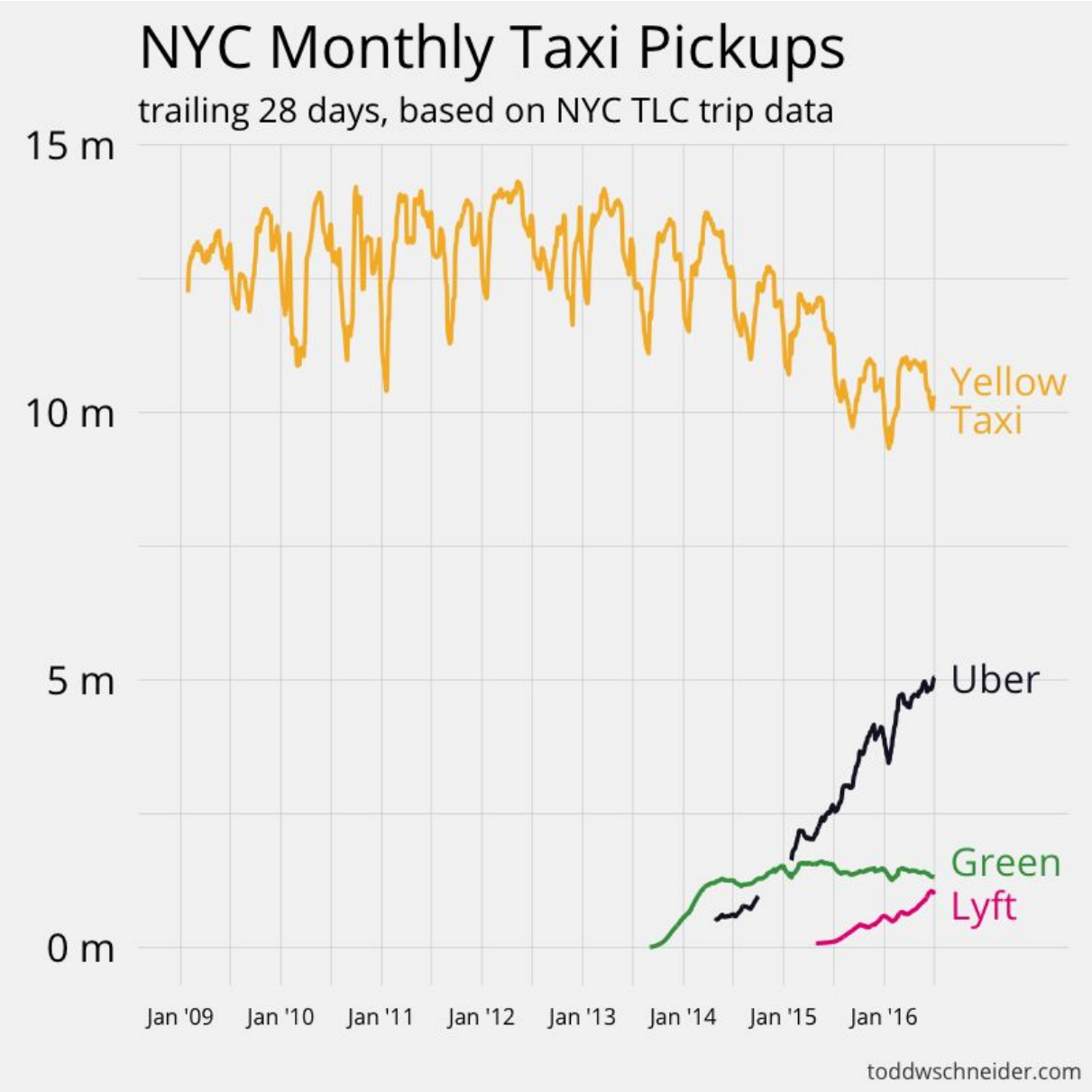
Significance

- The ridesharing industry is new and highly controversial, and many argue that companies like Uber and Lyft are destroying jobs.
- If instead we can demonstrate that Uber is providing a service to customers who were previously lacking transportation options, we can conclude that Uber is providing a necessary public service.
- We want to know where these new customers are coming from and their demographics in an effort to understand why Uber has become a more viable transportation option than taxis or public transit.
- Additionally, identifying key regions of NYC in which Uber has developed previously untapped FHV markets can inform future business strategies. It may be possible for a corporation to grow in a responsible manner while minimizing externalities to others.

Datasets We Are Using

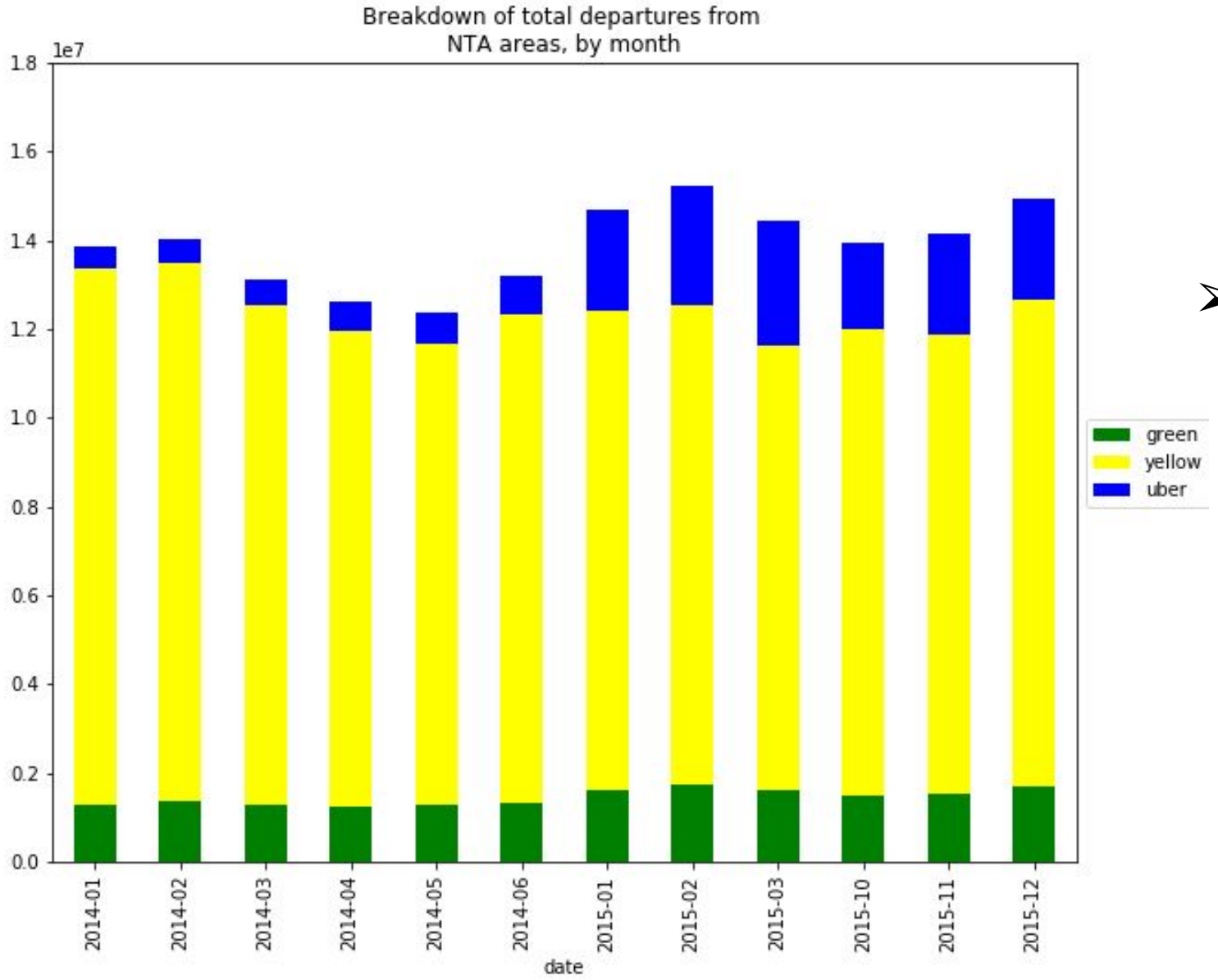
- Demographics
- Geographics
- Green_trips
- Uber_trips_2014
- Uber_trips_2015
- Yellow_trips
- Zones

Background



Graph courtesy of Todd W. Schneider, http://toddwschneider.com/posts/analyzing-1-1-billion-nyc-taxi-and-uber-trips-with-a-vengeance/

- While the competition-provided dataset only includes data for 2014-2015, we found that the number of yellow taxi trips declined around the time that Uber, Lyft, and green taxis entered the market



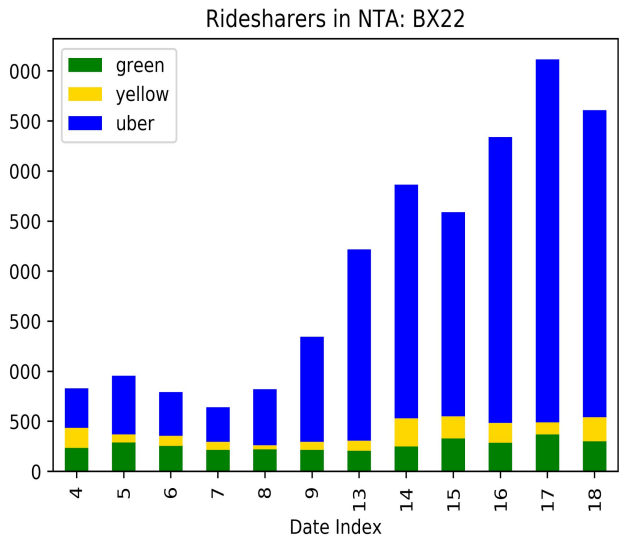
Background

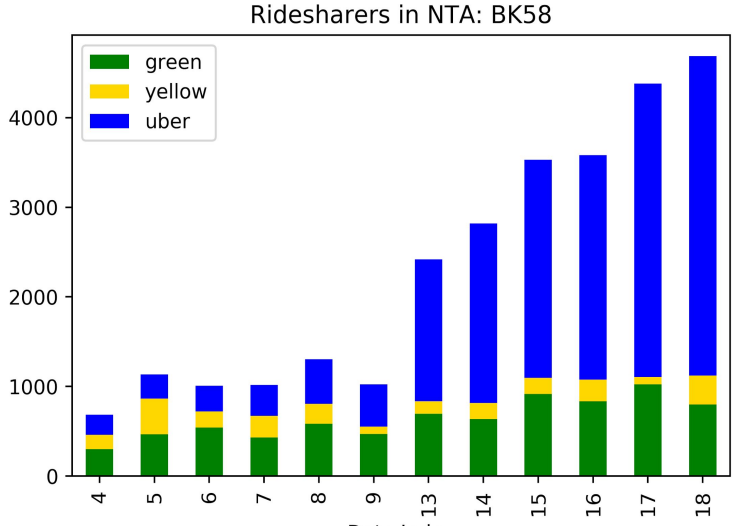
- We also observed that the total number of rides increasing slightly from 2014 to 2015, mostly driven by the increase in Uber

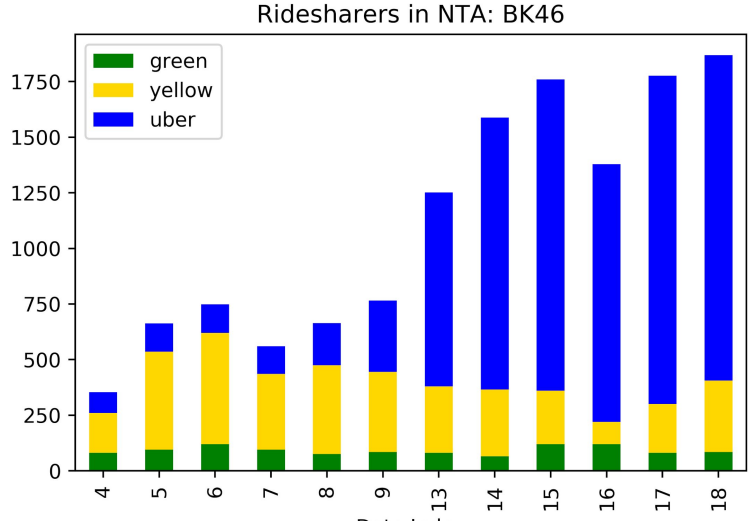
Methodology and Approach

- Converted data into common matric of NTA pickup location by creating polygon for each NTA from geographic data.
- Determined number of rideshares in each NTA and classified by month and type of rideshare (green taxi, yellow taxi, Uber).
- Selected NTAs in which the total number of all three types of rideshares increased by more than 200% between 2014 and 2015.
- From these, we then identified NTAs in which taxi usage did not decrease (Uber not cannibalizing), but Uber usage increased more than other taxi usage.
- This filtering resulted in 28 NTAs where Uber was the major cause of FHV increase.
- Analyze filtered NTAs for location and demographics

Key Findings

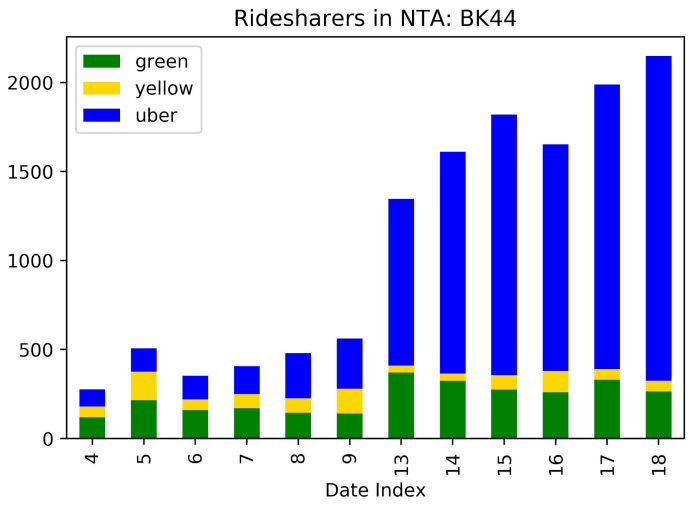


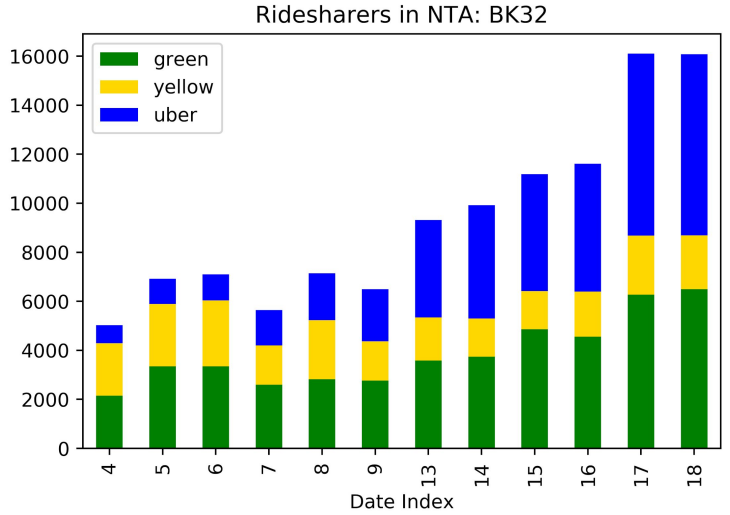


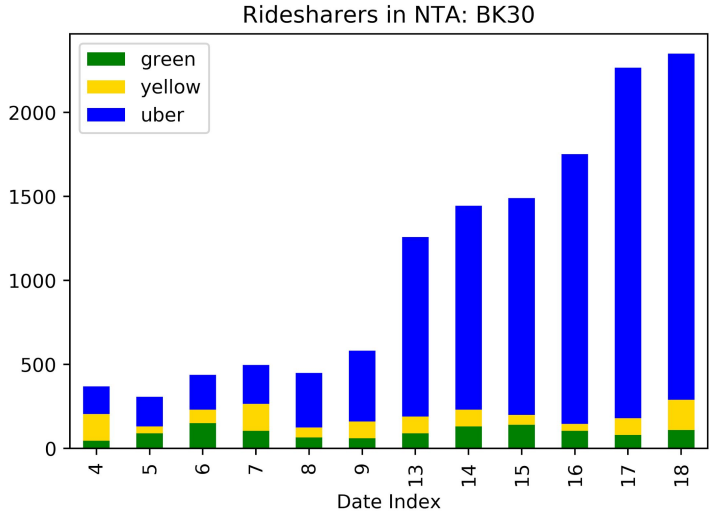


- These Individual NTA images shows that the rideshare increase is most in the case for Uber.
- Yellow and green cabs are having constant rideshare across the NTA

Key Findings Continued

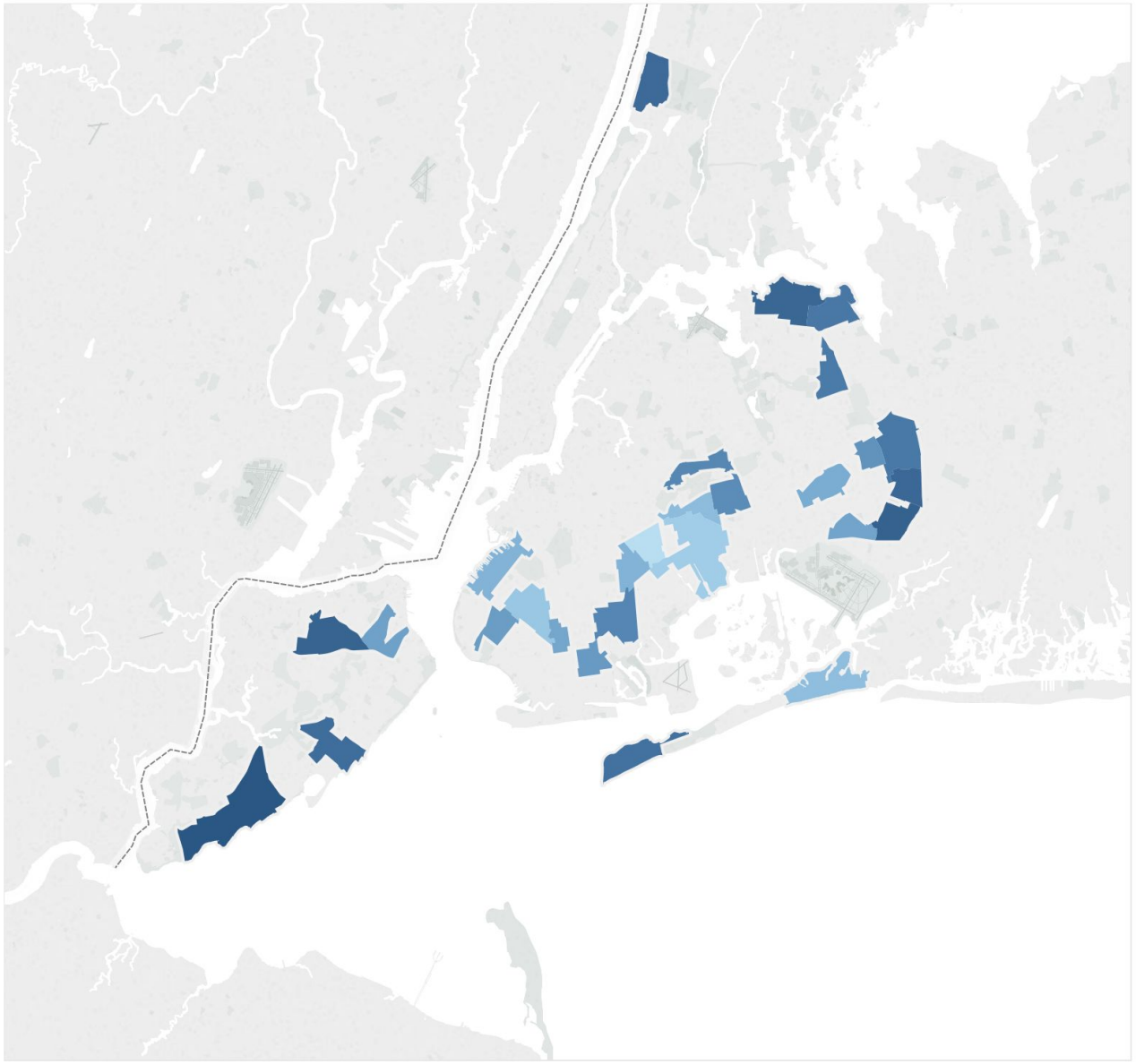




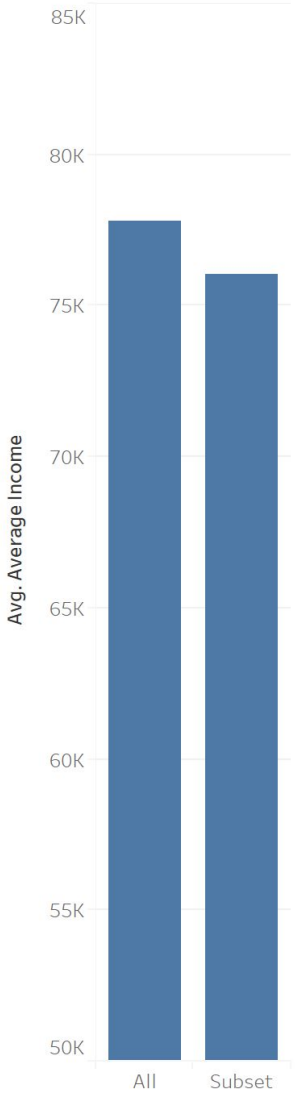


- Theses NTA explains the UBER has increased the rideshare in this area without affecting the other ride shares.

Identified NTAs, colored by Median Income



Mean Income for all NTAs versus identified NTAs



Key Findings Continued

- While these areas are relatively diverse, there is a higher concentration in Brooklyn and Queens, and none in Manhattan
- The NTAs we identified have a lower mean income than other NTAs.

Importance of Key Findings

- These findings explain how Uber had made inroads into the NYC Taxi worlds.
- They increased their market share without affecting other companies market share in certain NTAs.
- It also suggests that Uber is not simply cannibalistic but actually creating new markets that were not taken advantage of by green and yellow taxis.

Interpretation of Findings

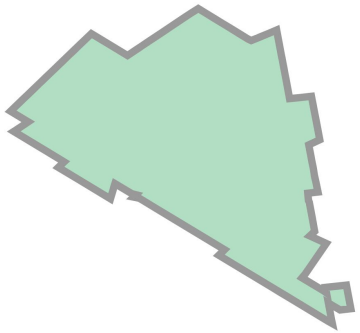
Our most important finding suggests that Uber beneficially impacted several of the boroughs surrounding Manhattan by providing more transportation options to several key underserved communities.

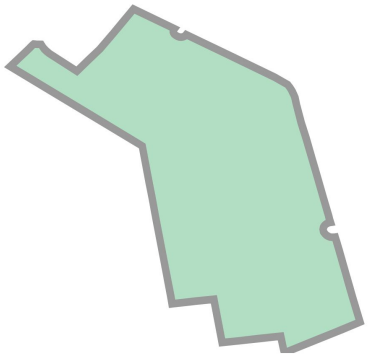
Data Manipulation and Exploration

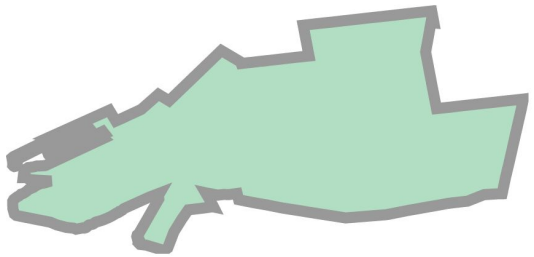
The first key problem we had to solve was finding out which NTA Uber 2014 pickups took place in. We were only given the GPS coordinates of the pickup, and we had to convert this information into an NTA. To do this, we found used an algorithm to determine if a given point fell within a polygon defined by a set of vertices. Each NTA is defined by a polygon of GPS coordinates. For each Uber ride, we searched through the NTA polygons to determine if the ride originated in that NTA.

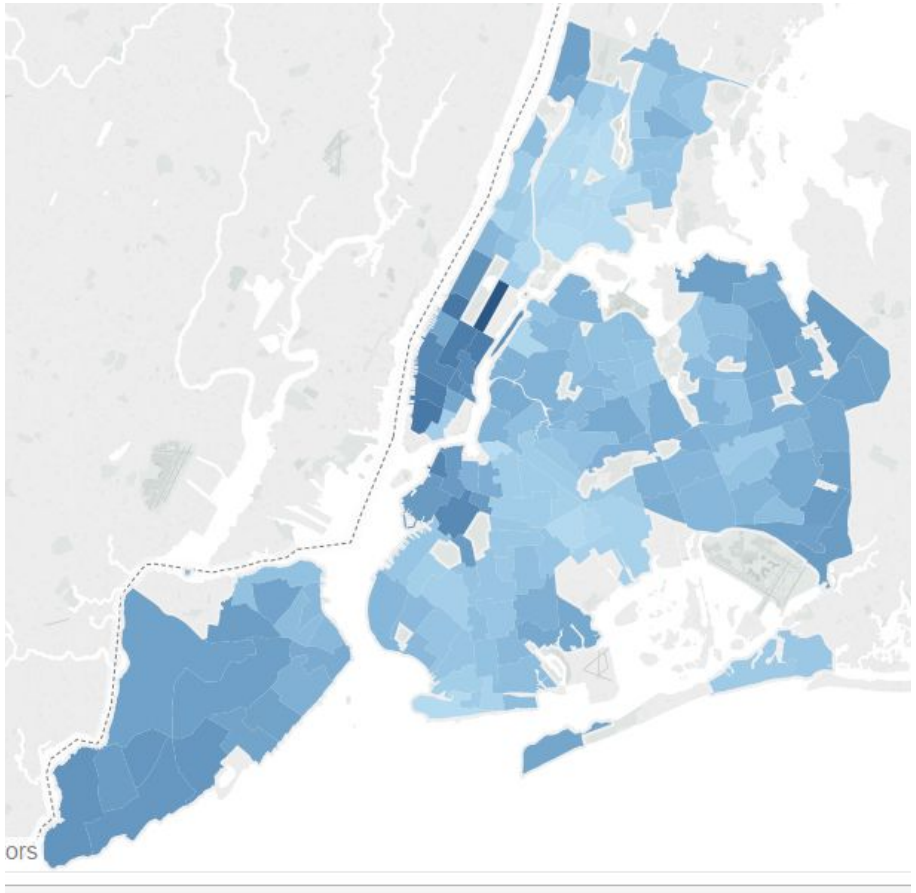
Polygon Analysis Supplement

Examples of NTA polygons. Clearly, determining whether or not a given point falls within a polygon is a difficult task. We took advantage of our computer's parallel computing capabilities to work on each NTA problem in parallel.





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Appendix

- Future Research Areas
- Unsuccessful Pathways
- RoadBlocks

  -Not enough Data: Trips are only consist of 6 months for 2014 and 2015)

  -Computational speed: Datasets took a long time to process on a personal machine.