# Spontaneous Retailer Demand: Evidence from Bike share

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## Motivation

Retailers care about attracting potential passerby customers into their store.

- Retailers invest in initiatives to increase passerby traffic
  - Akturk and Ketzenberg (2022), Babar and Burtch (2023), Perdikaki, Kumar, and Sriskandarajah (2017).
- Implicitly, passing traffic will stop into the store, whether spontaneous or as part of a planned route.
- Evidence on the connection from foot traffic to retail outcomes is limited.

Our work leverages bike share expansions in two major US cities to document changes in retailer visits from increased passerby traffic outside their storefront.

## What is a bike share station?

Bike share stations are scattered throughout the bike share network, where users must pick up and return the bike to one of the bike station docks. The fixed docks force riders to specific locations in the city.


## Research Questions

1. What is the lift felt by retailers from increased foot traffic from a nearby bike share station?
2. What are the underlying mechanisms which contribute to this lift?
   - Increased visibility from the bike share station
   - Ease of access to the retailer

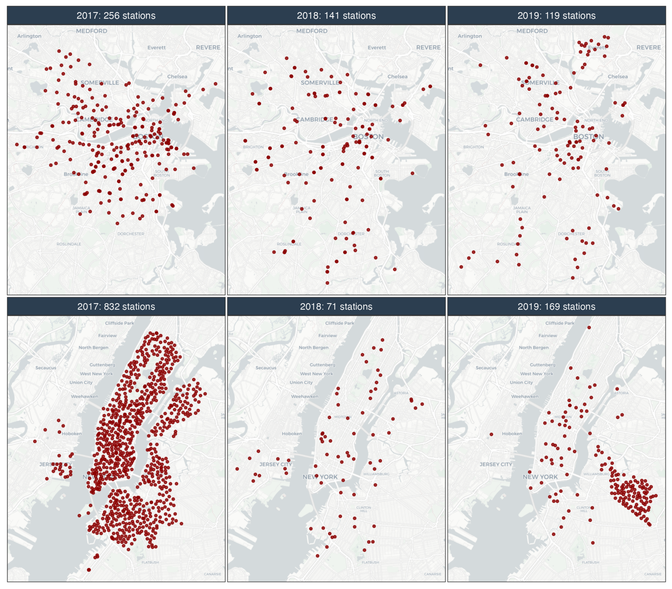
## Preview of Findings

Using cellphone mobility data and the entry of the bike share stations in Boston and New York City, we find a **7% increase in monthly retailer visits**.

- We develop an algorithm to determine the level of visibility between the storefront and bike share station.
- The lift in visits are largely driven by retailers which have storefronts with an unimpeded sight-line to the bike share station.
- Within retailers, locations which offer quick and spontaneous trips have the largest lift, i.e. **convenience stores**.

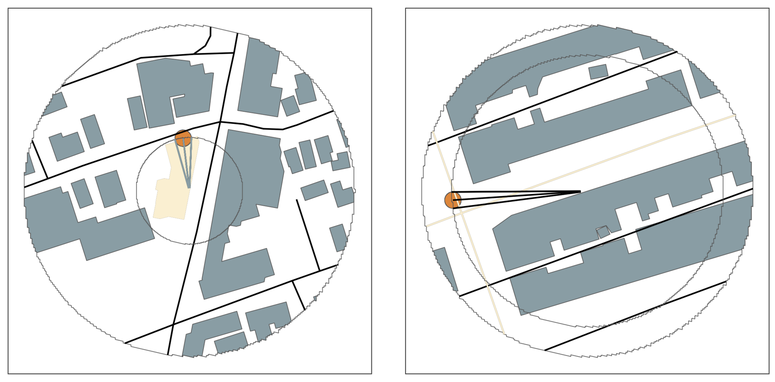
## Identification: Bike share station entry

We leverage temporal variation in the introduction of bike share stations throughout Boston and New York city throughout 2018 and 2019.




## Is the retailer visible from the bike share station?

We use geospatial roof print data to construct a representation of the city surrounding the bike share stations.

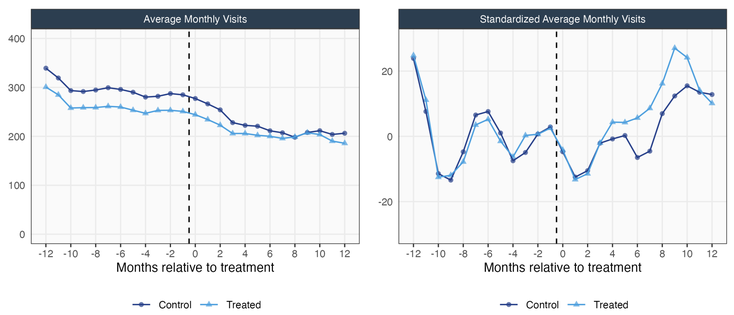


- We determine the exact storefront location using the retailer street address, surrounding roadways and median visiting cell phone location.
- Sight lines are constructed by based on whether there is another building obstructing the direct lines (yellow) between the bike share station (in orange) and storefront.

## Constructing a panel of retailer twins

For retailers treated by a station, we find their nearest neighbour via coarsened propensity score matching:

- Exact matching: brand name, and industry.
- PSM: coordinates, and monthly store visits three months to treatment.



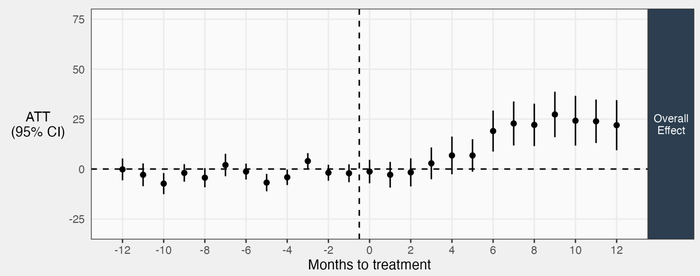

Average monthly visits per retailer observed in the period relative to bike share entry shown. Control firms are assigned the same treatment date as their matched treated firm.

Monthly visits are standardized by subtracting off the average visits across the pre-treatment period for each firm. Control firms are assigned the same treatment date as their matched treated firm.

## Main Results

Staggered difference-in-differences using Callaway and Sant'Anna (2021).

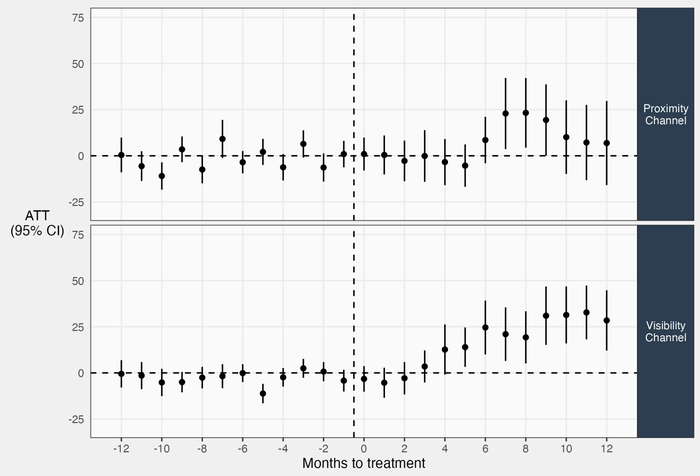
$$\text{Monthly Visits}_{it} = \sum_{k=-12}^{12} \beta^k D_{k(i,t)} + \mu_i + \eta_t + \varepsilon_{it}$$




- Effects take six months to realize, stabilizing at 25 incremental store visits attributable to bike share stations.
- This is a 7.65% increase from the average monthly store visits for treated retailers prior to treatment (19.0 / 248.33).

### The lift is driven through visits to visible retailers

Subsetting the data into retailers which have a clear line of sight to the bike share station allows to test whether visibility is influencing the bike share rider's decision to visit the retailer.

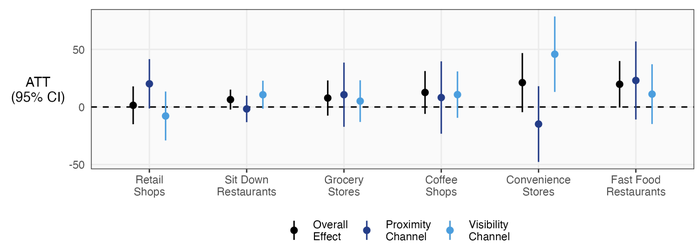



Testing our hypotheses:

- **Spontaneous decisions:** Splitting the data based on our visibility classification highlights the importance of the retailer being visible from the bike share station.
- **Ease of Access:** The lack of effects in the Proximity Channel fails to provide evidence that riders are using bike share to make planned retail trips.

## Not all retailers are treated equal

We observe the largest effect sizes within convenience stores that have a visibility channel to the newly placed bike share stations.

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