How Will the L Train Closure Impact Commercial Activity?

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Background

The Canarsie tunnel connecting the L Train Bedford Ave and 1st Ave stations was damaged by Hurricane Sandy in 2012

200,000 people per day commute using the tunnel

Increased rider volume in recent years requires capacity expansion

5% growth in 2014 alone

MTA plans to **combine Sandy repairs and capacity expansion** into one project

Highly **unfavorable reaction** from business community and commuters

Question

Can we quantify the economic impact on businesses around Bedford Avenue Station caused by the closure of the Canarsie tunnel?

The Stakeholders

- Merchants associations: Brooklyn Chamber of Commerce
- City Agencies: MTA, Small Business Services
- Citizenry: Community Boards 1 and 4 in Brooklyn, Permanent Citizens Advisory Committee to the MTA

Data and Methodology

Method split into four steps:

1. Estimate the size of the economy in dollars using household expenditures

2. Estimate foot traffic to the area around Bedford Ave. using MTA turnstile data

3. Determine the relationship between foot traffic and economy size

4. Calculate new size of economy of area around Bedford Ave.

Data and Methodology

1. Estimate the size in dollars of the local economy using relevant household expenditures

   Estimate Williamsburg economy in relevant expenditure categories - **$911M**

   - Healthcare, Apparel, Dining, Entertainment, and Misc.

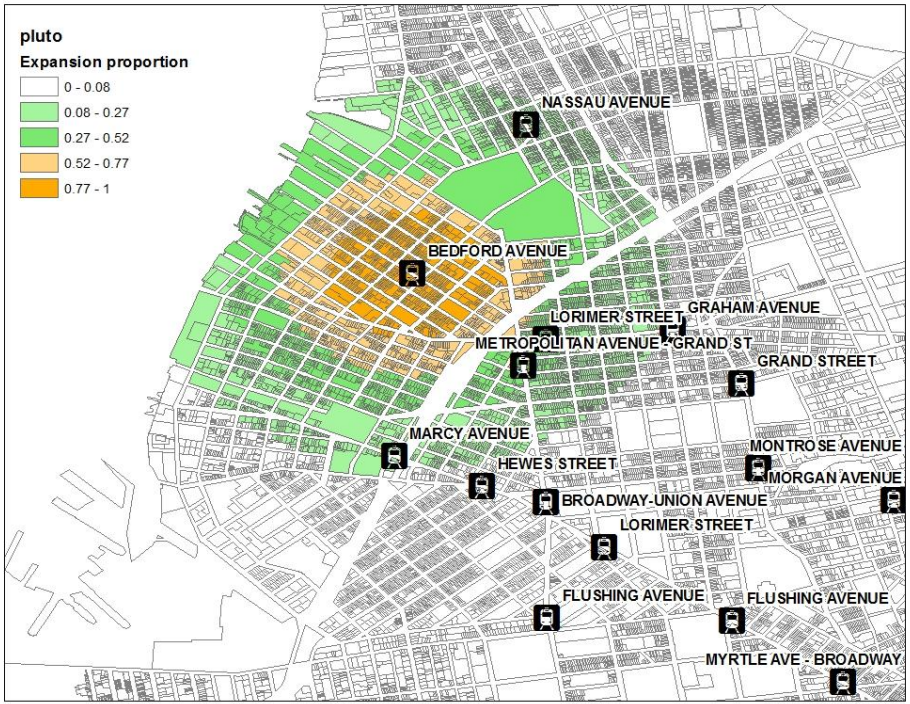
   Estimate economy size within the Bedford radius

   - Calculate proportion of commercial area within a quarter-mile buffer around Bedford as part of total Williamsburg - **6.5%, or $59M**

Data used: American Community Survey (ACS), NYCEDC Economic Snapshot May 2014, DCP MapPluto

Data and Methodology

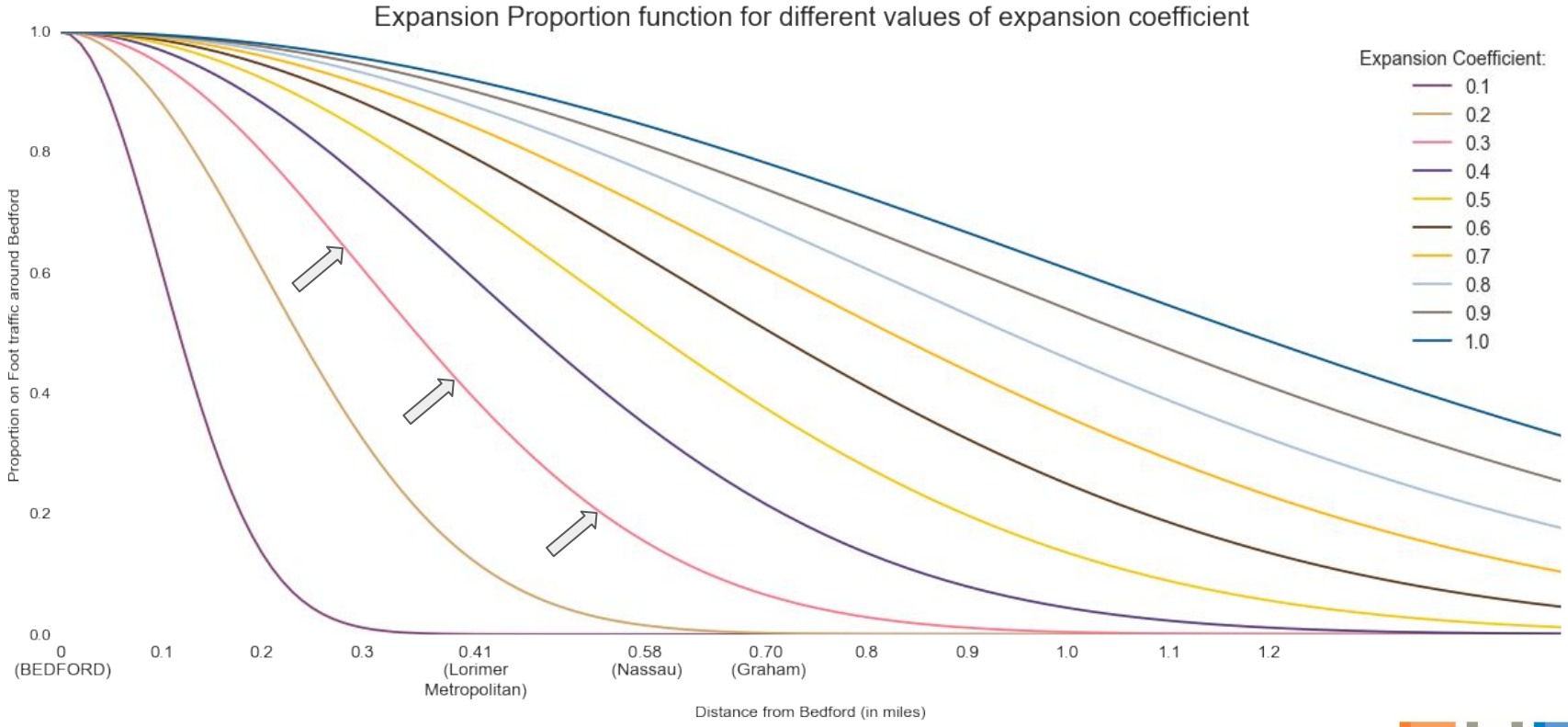
2. Estimate foot traffic to the area around Bedford Ave. using turnstile exit data provided by the MTA



- Calculate average daily turnstile exits for the five nearest stations within our study area.
- Estimate the percent contribution each station has to foot traffic around Bedford Ave. depending on distance

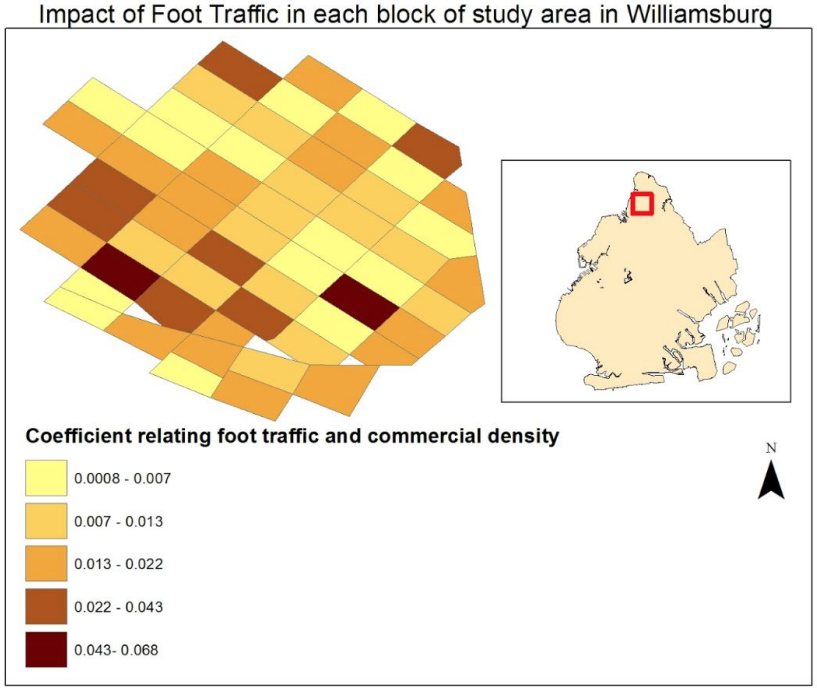
Data used: MTA turnstile from 1/31/2015 to 3/4/2016, distances from Google Earth

Data and Methodology



Data and Methodology

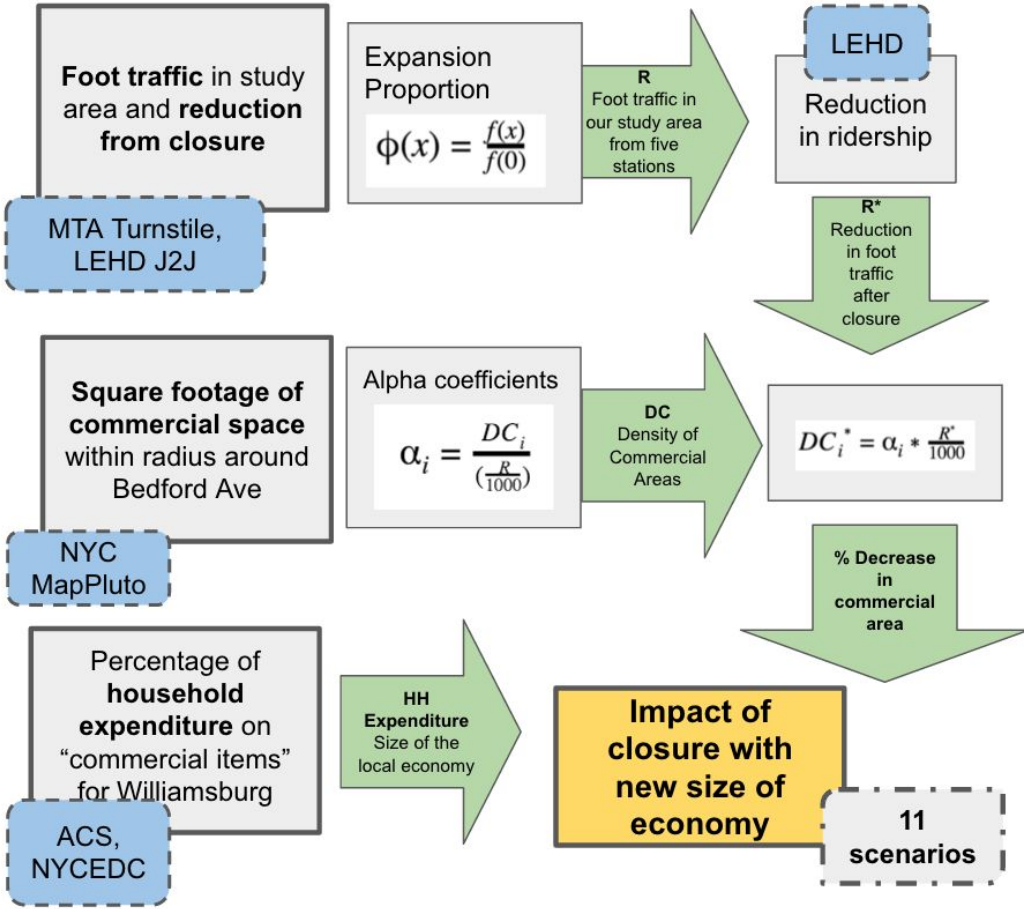
3. Determine the relationship between foot traffic and economy size



- Estimate the relationship between foot traffic and commercial area in each census block.
- Estimate the reduction in commercial density caused by reduction of foot traffic
- After the shutdown, Bedford Ave will lose all of its traffic from Manhattan (42%)

Data used: NYC PLUTO 2015, LEHD

Methodology Overview



Results

4. Calculate new size of economy of area around Bedford Ave. using the reduced commercial area and foot traffic

Traffic Retained by Alt. Transportation (%)	Bedford Av. Forecasted Daily Foot Traffic	Predicted Expenditure ($)	Est. Expenditure % Decrease
0	14,362	29,916,952	0.49
0.1	15,867	33,052,026	0.44
0.2	17,371	36,185,016	0.39
0.3	18,876	39,320,090	0.34

All scenarios use an expansion coefficient of 0.3

Each 10% of riders accommodated reduces the economic impact by 5%

Results

- We cannot predict which businesses might close or why
  - Local business environment is highly diverse, and firms fail for many reasons
  - No financial disclosures publicly available for private businesses

- The model calculates a *net* economic impact
  - Some businesses may thrive if consumers previously preferred to buy outside of Williamsburg, but are now unable

Conclusion

Outcome:

- Model that uses open data to present possible outcomes of economic impact based on the proportion of people able to visit the area after a station shutdown
- Can be applied to any part of the city serviced by the MTA subway network

Limitations:

- Assumes causation between commercial area, foot traffic, and economy size
- Vulnerable business types not measured

Future work:

- Evaluate and adjust assumptions after shutdown project is finished
- Modify the methodology to incorporate length of shutdown
- Replicate model in Excel to increase accessibility and ease of use

GitHub Repository: github.com/DQOfficial/usi_L_train