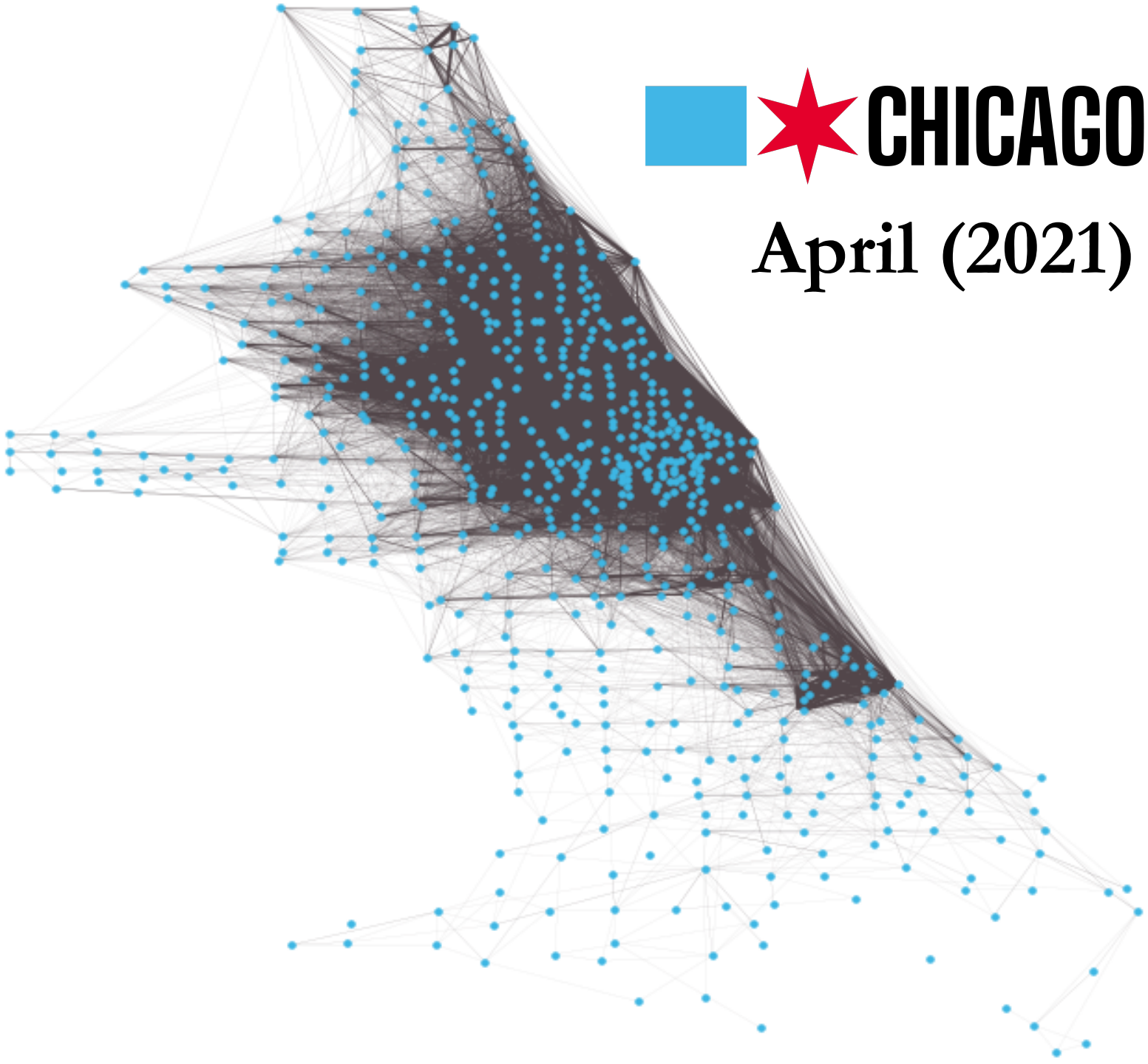
BIG BUS
BIGBUS CHICAGO
DIVY

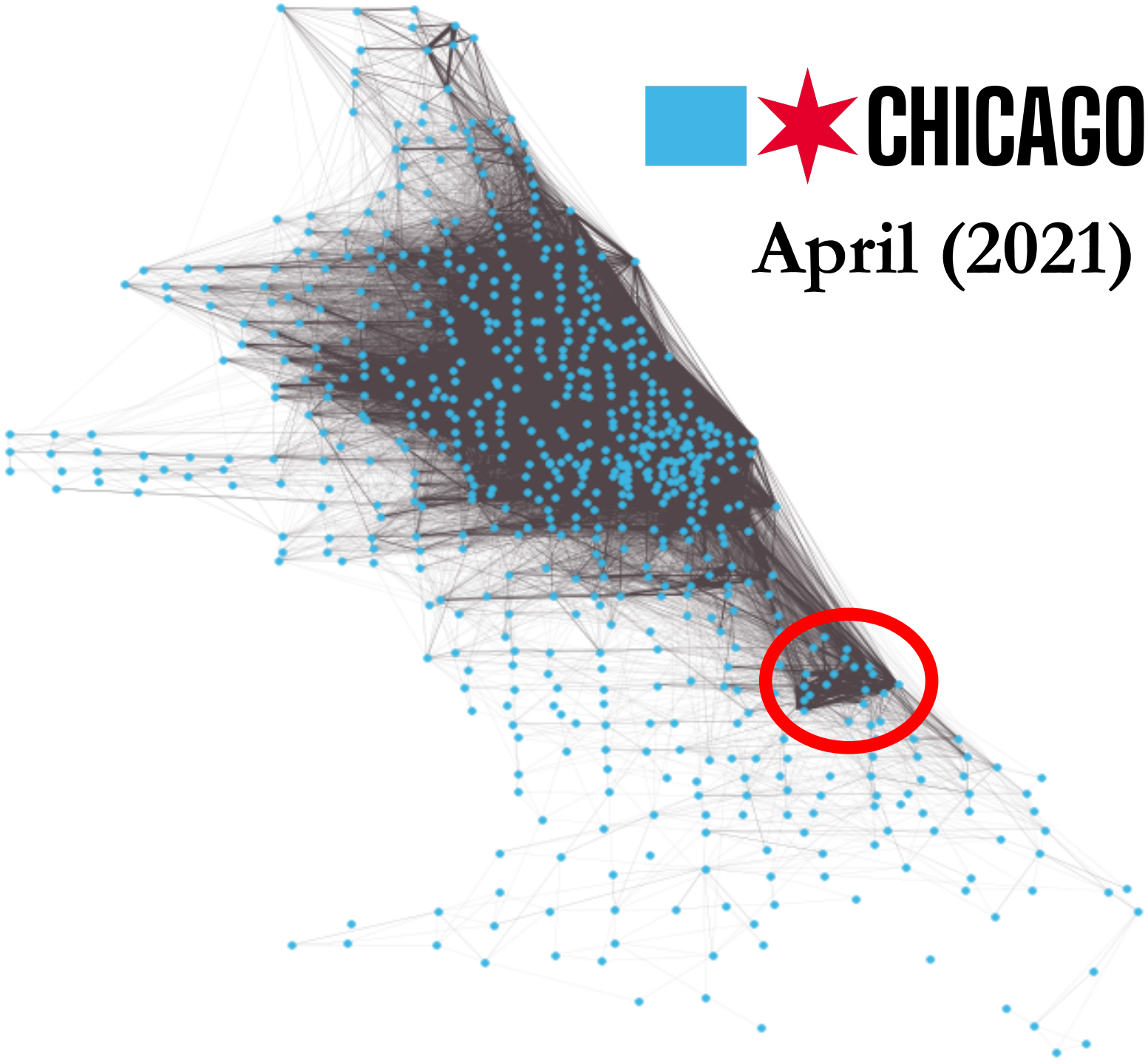
One-time payment (casual)

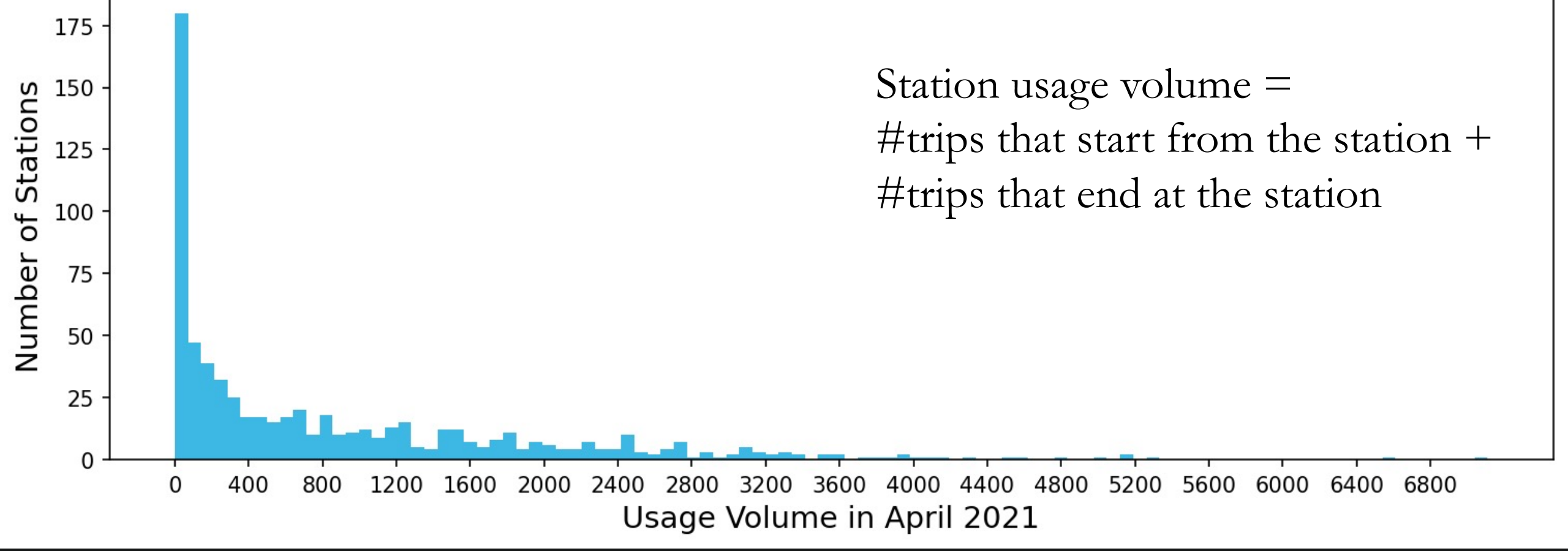
Membership



CHICAGO

April (2021)


CHICAGO
April (2021)



Station usage volume =
#trips that start from the station +
#trips that end at the station

What factors contribute to
<u>variation in the usage volume</u>
of divvy bike stations?

Hypothesis

1. Location

H1a:

proportion of causal riders → (+) → locate at tourist sites → (+) → Station usage volume

Hypothesis

1. Location

H1a: proportion of causal riders → (+) locate at tourist sites → (+) Station usage volume

H1b: proportion of weekday trips → (+) locate at residential area → (−) Station usage volume

Hypothesis

2. Crime

H2a:

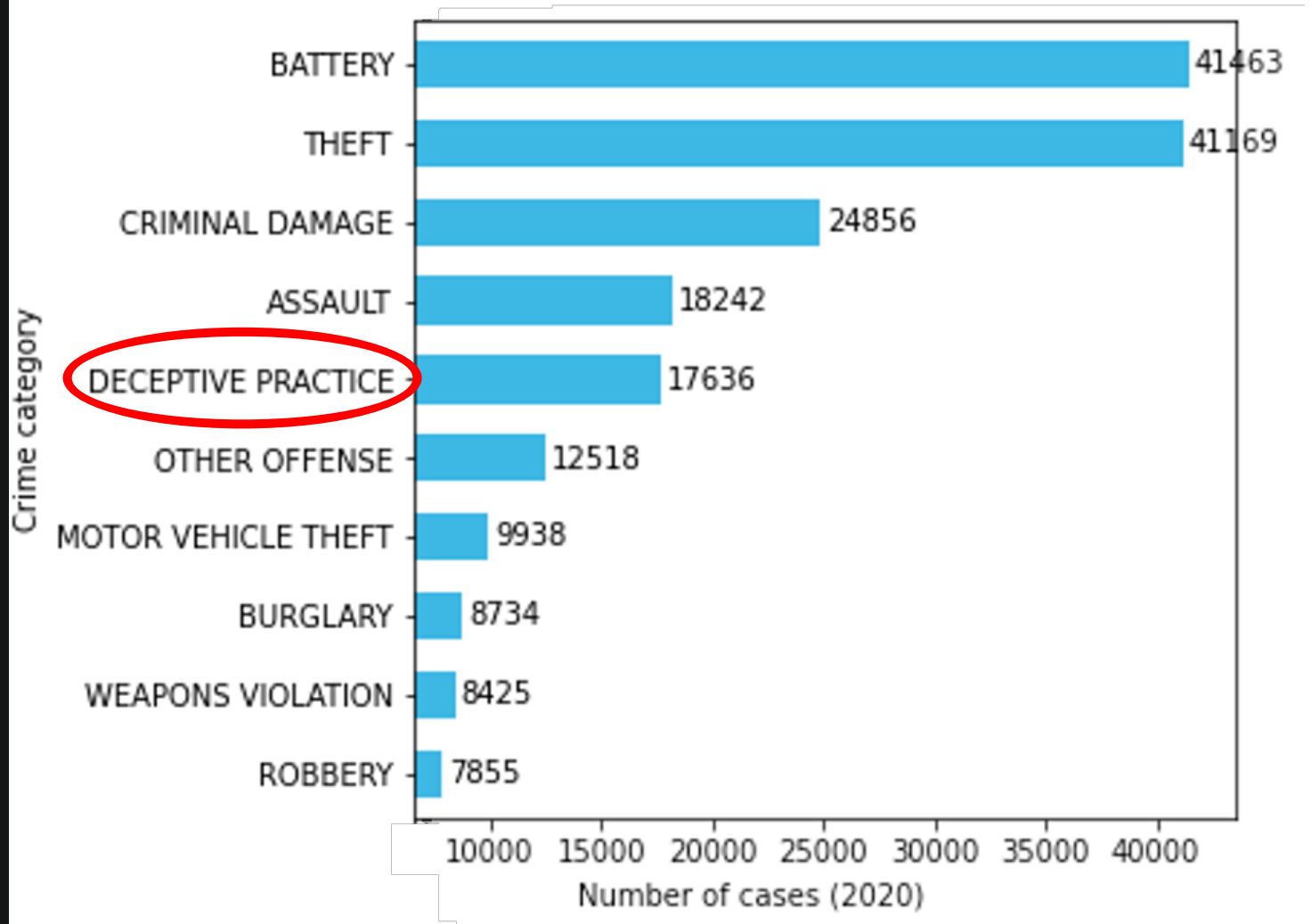
physical crimes

H2b:

white collar crimes

Station usage volume

Top 10 Crime category (Chicago 2020)



Hypothesis

2. Crime

H2a:

physical crimes

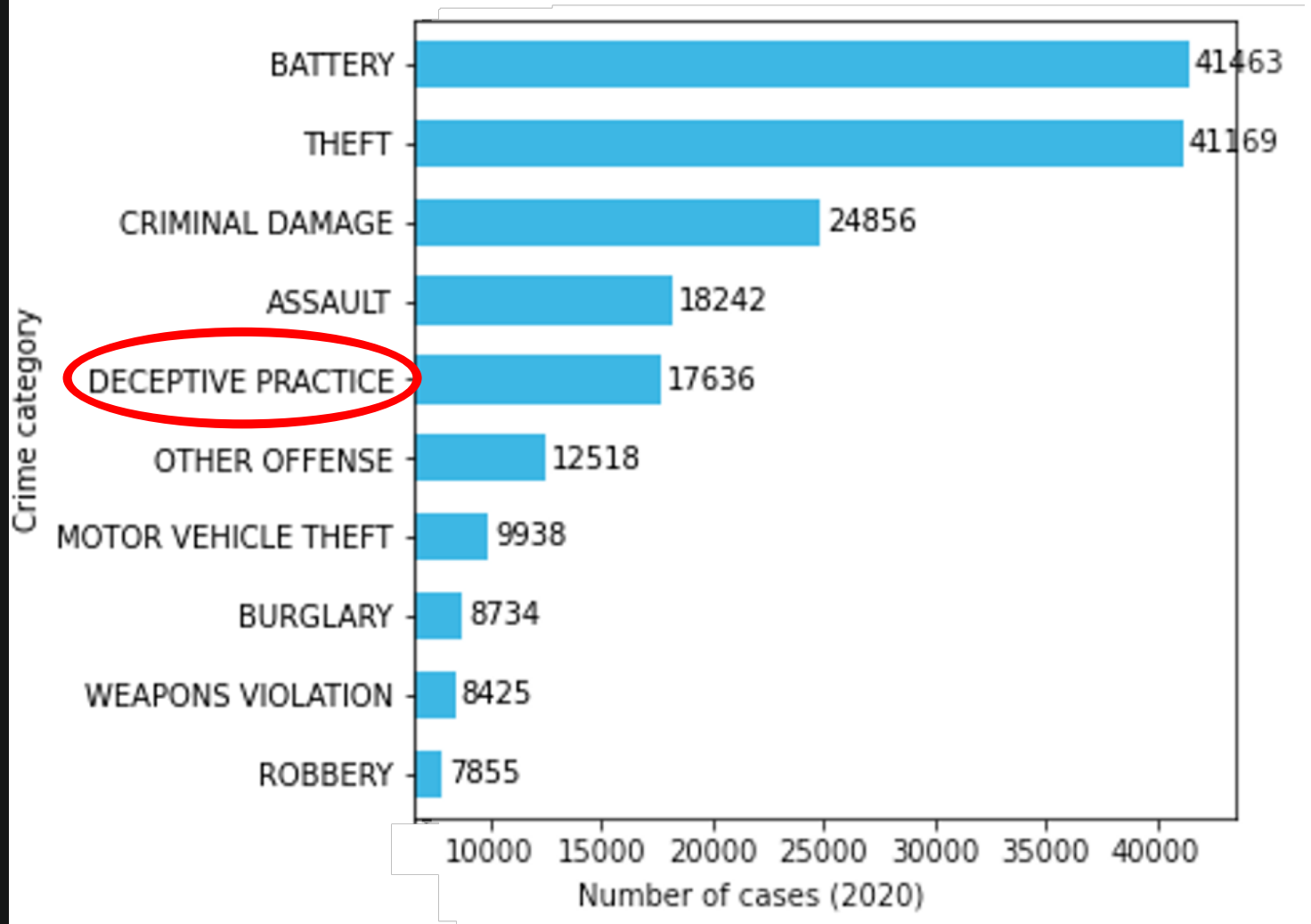
(−) → Station usage volume

H2b:

white collar crimes

(+) → Station usage volume

Top 10 Crime category (Chicago 2020)



Hypothesis

3. Supply & demand

H3a: supply

other divvy bike stations nearby

H3b: demand

Population density

Station usage volume

Hypothesis

4. Alternative public transportations

Substitute or complement?

H4:

Distance to the nearest rail station

# of bus stops nearby

+

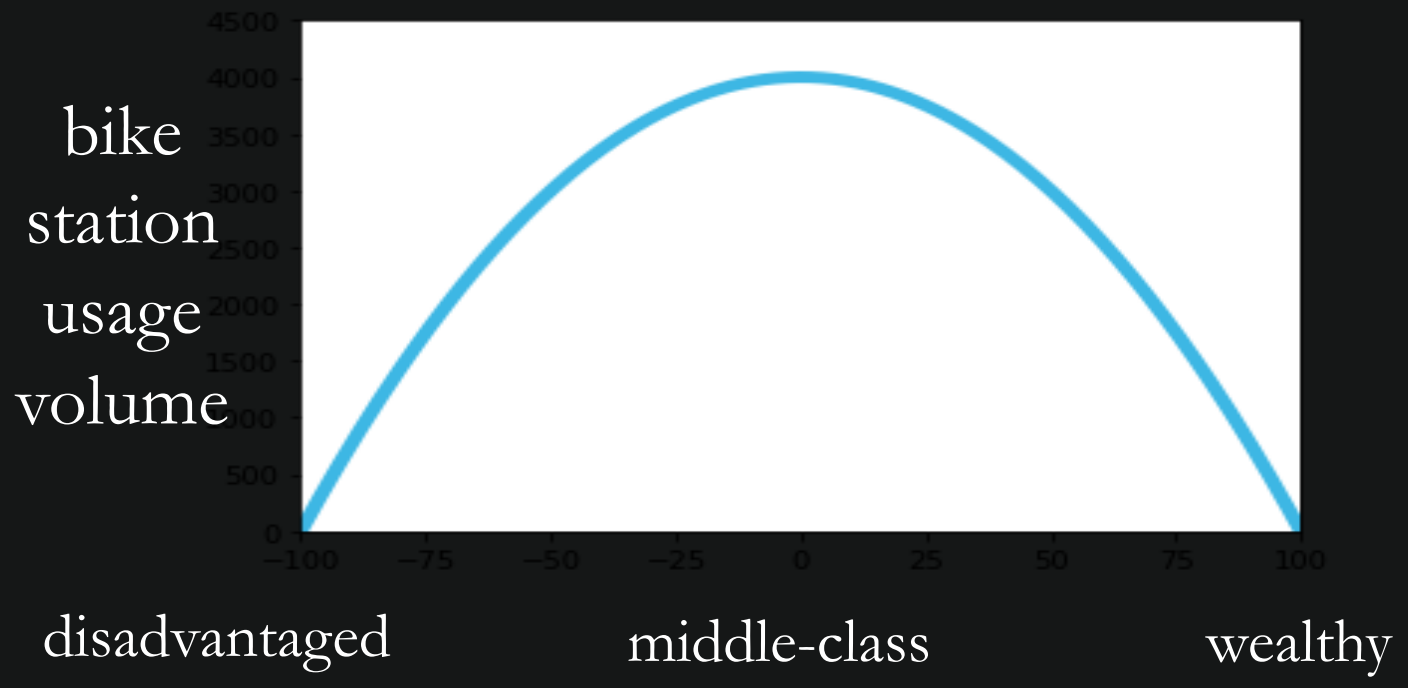
→

Station usage volume

5. Socio-economic status

H5:

Average home value nearby → Inverse "U" → Station usage volume



Hypothesis

6. demographics

H6a: Racial composition → Station usage volume (associations exist)

H6b: Proportions of young people → Station usage volume (+)

Method

- Station-level dataset (n=681)
- Log transform all variables (1 outcome, 23 predictors)
- Multivariate OLS regression

Data sources	variables
Divvy historical trip data (2021)	Station usage volume, one-time payment, weekday, # other bike stations
Chicago Crime records (2020)	# physical crime, # white collar crime
CTA – Rail Stations (2019)	Distance to the nearest rail station
CTA – Bus Stops (2020)	# bus stops
US Census (2010)	Population density
Zillow Housing data (2021)	Average home value
Chicago Population Counts (2019)	Racial composition (black, Asian, latinx, white), age composition (18-29, 30-39, 40-49, 50-59, 65+)

Results

1. Location

H1a: proportion of causal riders → (+ ?) locate at tourist sites → (+ ?) Station usage volume

H1b: proportion of weekday trips → (+) locate at residential area → (−) (+) Station usage volume

Location	Crime	Supply/demand	Alt public transport	Socio-economic	demographics

Results

2. Crime

H2a:

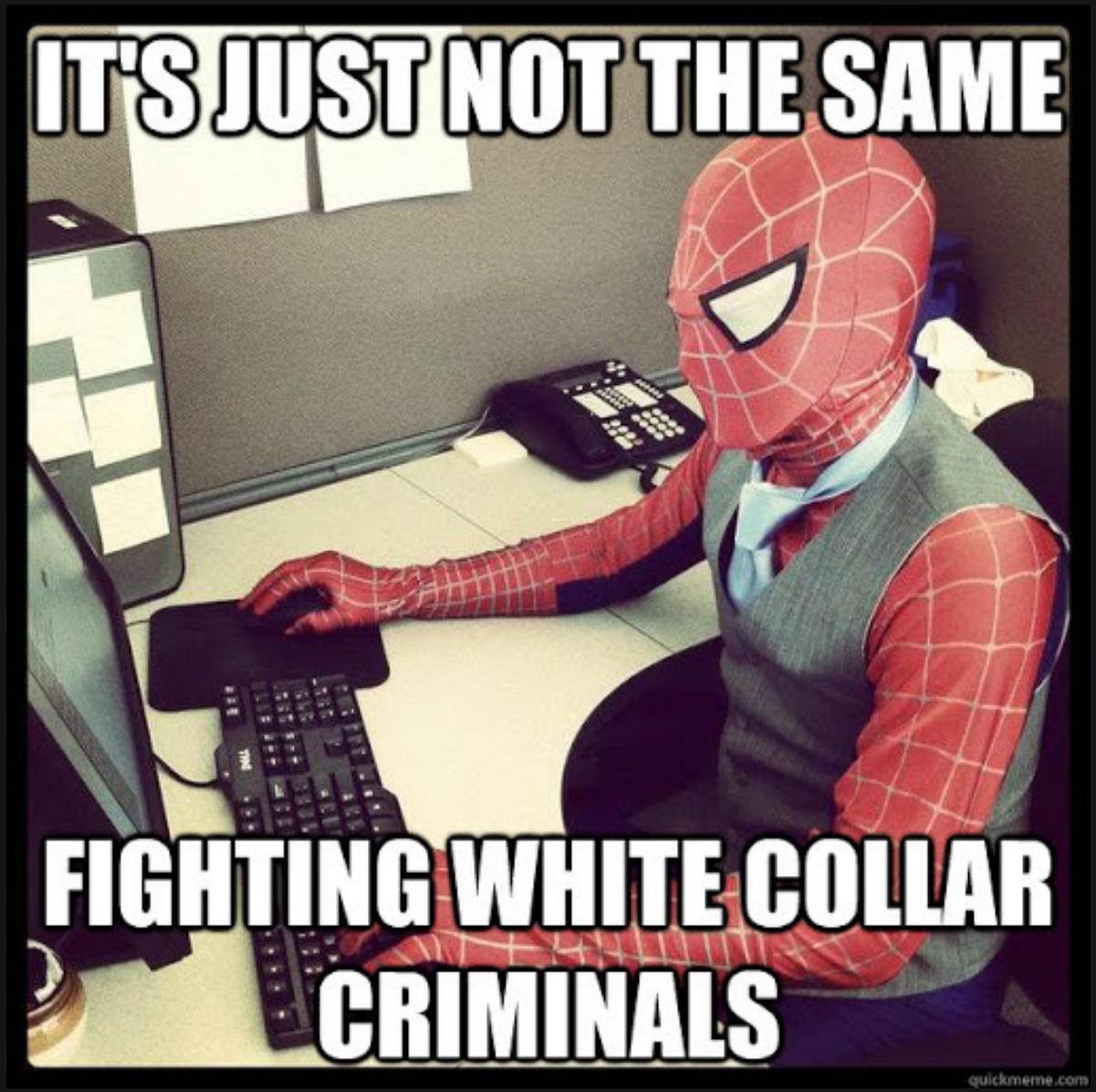
physical crimes

H2b:

white collar crimes

− ↘ ↙ +

Station usage volume



Results

3. Supply & demand

H3a: supply

other divvy bike stations nearby

H3b: demand

Population density

Station usage volume

Network effect!

4. Alternative public transportations

H4:

Distance to the nearest rail station

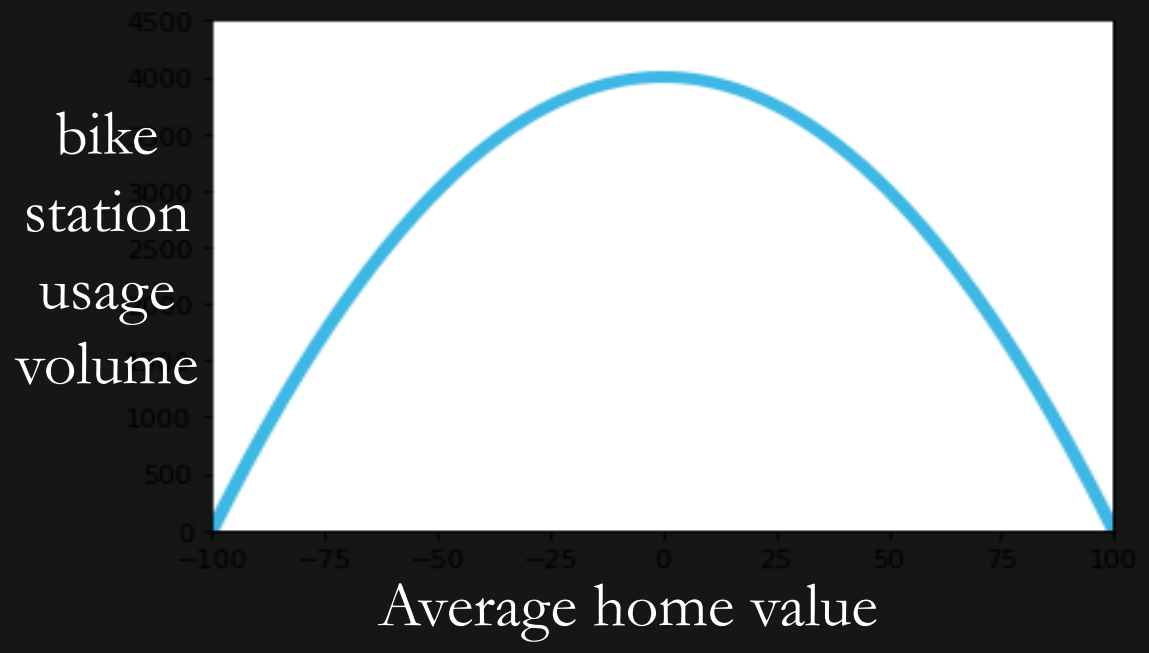
# of bus stops nearby

Station usage volume

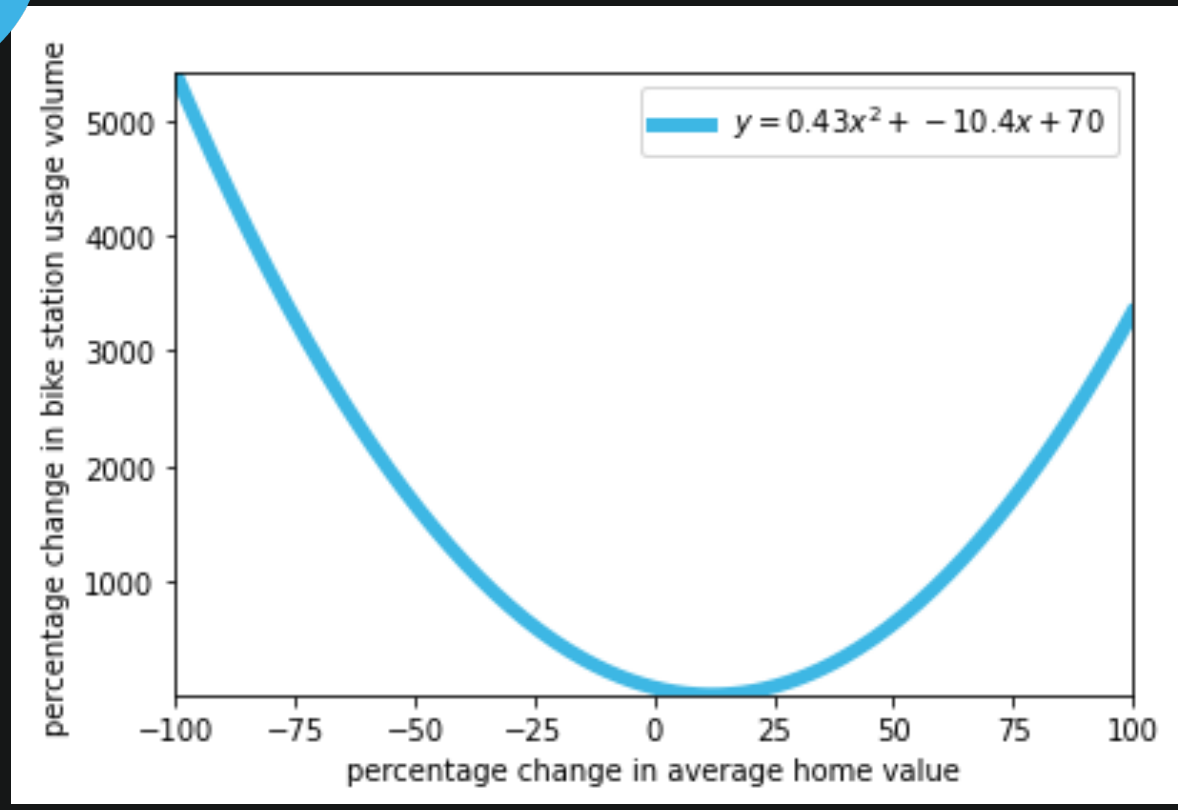
Substitution and complement effects cancel out each other?

5. Socio-economic status

H5: Inverse "U" shape



Result: "U" shape



6. demographics

H6a: Racial composition → Station usage volume

+ for white, Asian
- for Hispanic
no association for Black

H6b: Proportion of Young people → Station usage volume

+

For 18-39 age group

Thank you!