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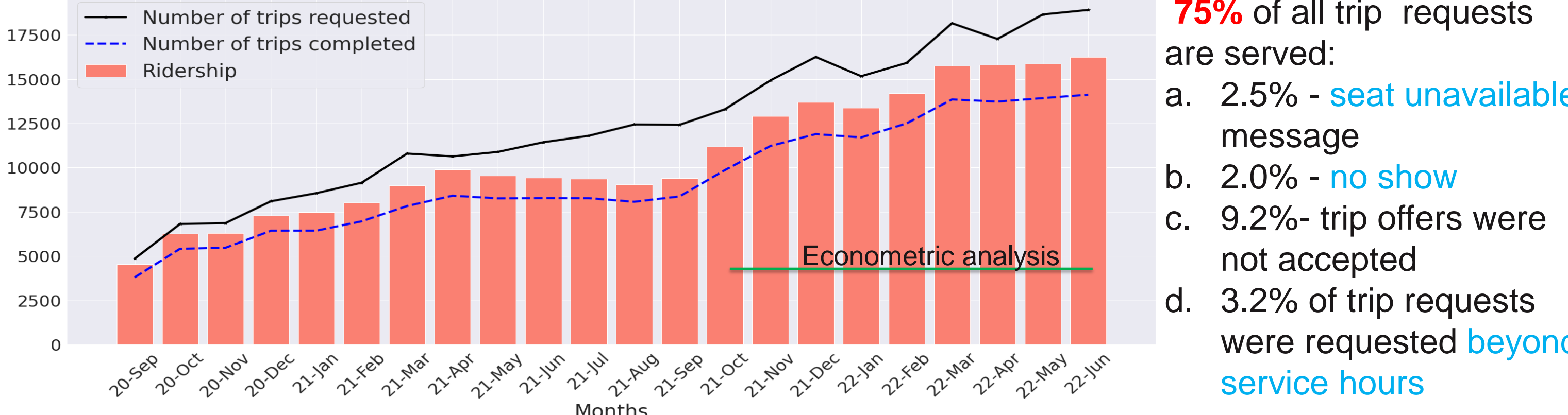
Introduction

Wilson replaced its fixed route buses in September 2020. Users request a trip on-demand using app, telephone

Population: 40351
Zero vehicle households: 12%
Household below poverty: 23%



Descriptive analysis



Econometric results

Negative binomial regression

Variable	Coefficient
Intercept	-0.393 (0.07)***
ln(Population)	0.107 (0.003)***
% HH below poverty	0.002 (0.002)***
% African American	-0.004 (0.0002)***
% Hispanic/Latino	-0.002 (0.0003)***
% Female population	0.014 (0.0006)***
% Population (18-44)	-0.002 (0.0004)***
% Unemployed	-0.002 (0.0004)***
Number of low-wage jobs	0.002 (0.0002)***
ln(Number of intersections)	0.065 (0.008)***
Urbanization class: Ref: Rural	
Suburban	0.064 (0.056)
Urban	0.108 (0.055)*
Time of day: Ref: Hour 5:00	
Hour 6:00	0.128 (0.053)*
Hour 13:00	0.106 (0.048)*
Hour 14:00	0.185 (0.048)***
Hour 15:00	0.079 (0.048)*
Hour 16:00	0.086 (0.086)*
Day of Week: Friday	-0.024 (0.011)*
Day of Week: Saturday	-0.021 (0.011)*
Interactions	
Suburban*Hour 6	-0.137 (0.069)*
Suburban*Hour 9	-0.181 (0.063)**
Urban*Hour 17	0.119 (0.063)*
Log-likelihood	-112306.261
Num.Obs.	68778

Elasticities from regression coefficients

Variables	Elasticities
Population	0.10
% HH below poverty	0.20
% African American	-0.40
% of Hispanic/Latino	-0.19
% Female population	1.40
% Population (18-44)	-0.19
% Unemployed	-0.19
Number of intersections	0.06
Number of low-wage jobs	0.03

- 1% increase in population is associated with 0.10 % increase in demand

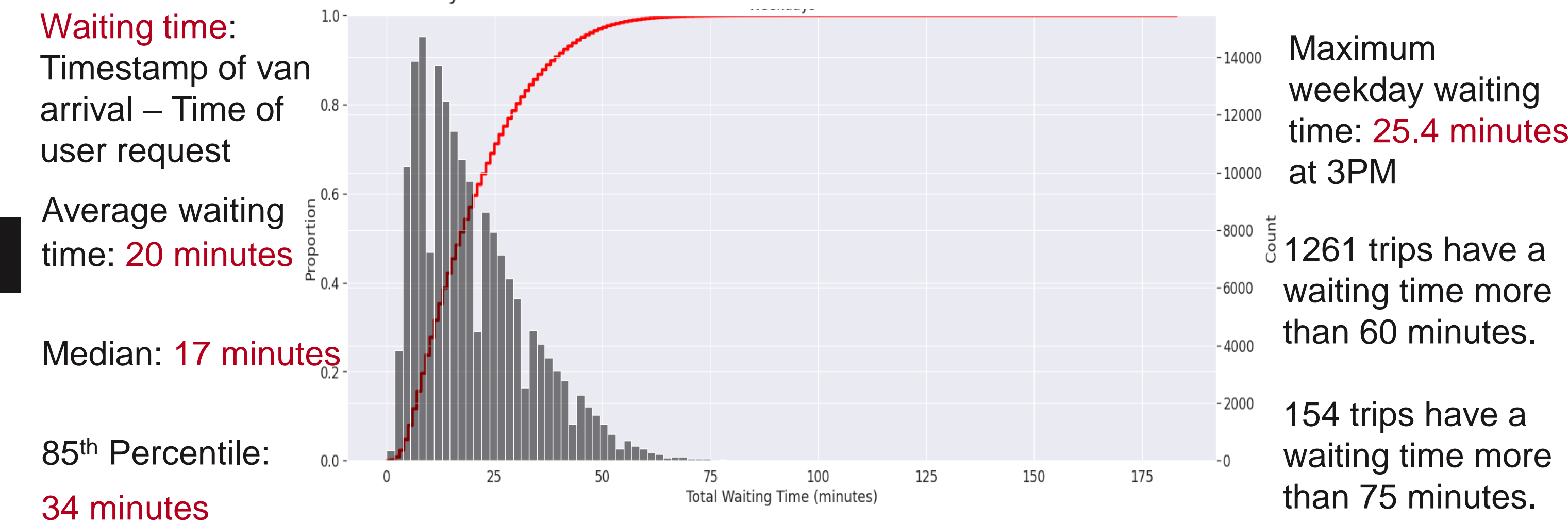
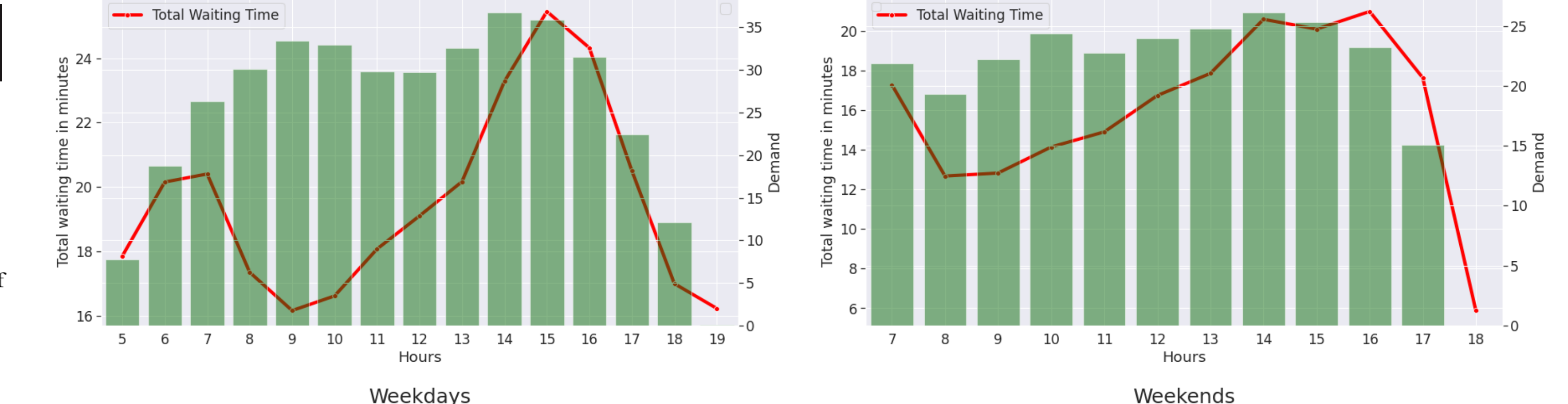
- Higher demand in early morning and in afternoon

- Suburban areas are associated with lower demand in the morning and urban areas generate higher demand in the evening.

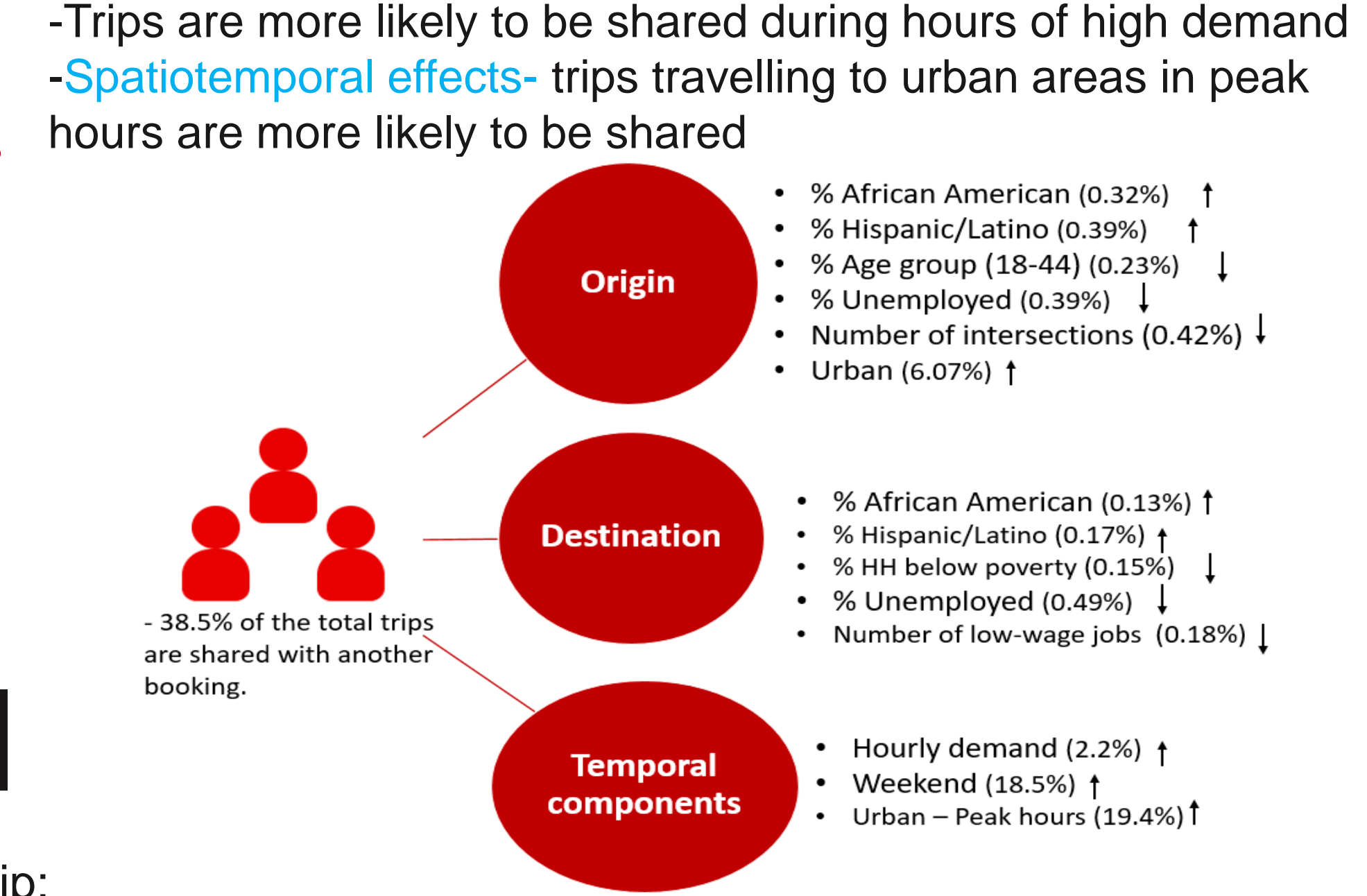
Data source



4.5% of all trips require ADA compliance



Likelihood of shared trips



Research Questions

- What are the spatial, temporal, and socioeconomic determinants of microtransit demand? Interactions?
- When and where are trips more likely to be shared with another booking?

Motivation

- Limited studies with trip-level analysis of microtransit
- Understanding determinants of microtransit demand and spatiotemporal variation
- Useful for transit agencies to understand the suitability of microtransit for their service area
- Identifying neighborhood, built environment, and temporal factors that encourage shared trips

Econometric analysis

Microtransit demand

- Number of users in a census blocks per hour:
- Dependent variable
- Negative binomial model

$$Pr(y_{jt}|\mu_{jt}, \alpha) = \frac{\Gamma(y_{jt} + \frac{1}{\alpha})}{\Gamma(\frac{1}{\alpha})\Gamma(y_{jt} + 1)} \left(\frac{1}{1 + \alpha\mu_{jt}}\right)^{\frac{1}{\alpha}} \left(\frac{\alpha\mu_{jt}}{1 + \alpha\mu_{jt}}\right)^{y_{jt}}$$

$\mu_{jt} = e^{\beta x_{jt} + \epsilon}$, ϵ follows gamma distribution

y_{jt} = number of completed trips in block j in month t.

Likelihood of shared trips

- Binary indicator on shared status of a trip:
- Dependent variable
- Binary logit model

$$\ln\left(\frac{p_i}{1 - p_i}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \dots + \beta_n x_n$$

Summary of findings

- Areas with more households below poverty and higher number of low-wage jobs generate higher demand
- Urban areas are associated with greater demand
- Trips are more likely to be shared in hours of greater demand and in areas with higher ratio of non-white population