Scoot over: Determinants of shared electric scooter use in Washington D.C.

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INTRODUCTION

- Our study examines the factors that determine the presence of e-scooters, as well as those that cause variation in e-scooter presence between each consecutive hour and throughout the day.
- Data on the location of e-scooters in the Washington D.C. area over six full days was collected.
- Then, multi-level mixed effects linear regression models were generated to investigate the impact of new, land use characteristics, and transportation infrastructure on e-scooter presence, controlling for weather conditions.

COVARIATES

Sociodemographic

- Population Density
- Median Income

Land Use

- Bars
- Restaurants
- Fishnet

Location of Scooters

- Mobility
- Number of Bars & Restaurants
- Part of the CBD
- Part of a Metro Station

DATA

- APIs = publicly accessible VDOT
- Six Full Days in 2019
- Sources: Bird, Jump, Lime, Lyft, Skip, Spin

STUDY AREA

Distribution of e-scooters at selected periods of the day

REGRESSION RESULTS

- Coefficient of variation
- O.R. Sig. Coefficient Sig.

MODEL DESIGN

Multi-level mixed effects regression modelling

- Model type
- 0 = O.R. 1 = No O.R. 2 = Yes
- Coefficient of variation
- SD

DISCUSSION

- Weekends & late nights: fewer e-scooters & less variation in hourly e-scooter presence.
- Higher population density & being located in the CBD more e-scooters, contributed to more change in the hour-to-hour numbers of e-scooters, but less variation throughout the day.
- Bikeshare stations & bicycle lanes positively impacted the presence & hourly change in e-scooters, low variation throughout the day.
- Metro stations positively impacted the average number of e-scooters in an area, and hourly movement to & from an area, not a significant indication of presence.

CONCLUSION

- This study contributes to a more comprehensive understanding of the factors that impact the presence as well as variations in the presence of e-scooters using data obtained for e-scooters operating in Washington D.C.
- The models suggest that e-scooters were available near bike lanes.
- Dataset cannot address if an e-scooter was placed as part of rebalancing or by a user.
- There is a relationship between public transport & e-scooters, it is unclear if they serve as an alternative last-mile solution.
- Utilisation patterns can help city planners & officials understand how shared e-scooters are used and how they interact with existing systems.

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