How Speed Stops are Affected Across Median Household Income in Connecticut.

Daniel Bench, Applied Data Analysis, Wesleyan University

Introduction

- When drivers are stopped by law enforcement, the drivers often perceive the stops as an infringement of their rights, especially considering the perceived cause of the stop and the possibility of racial profiling (Chenane 2019).
- Based on a study done by Texas Highway Patrol, drivers in the bottom 20% of the income level are more than twice as likely to be stopped than drivers in the top 20% (Feinberg & Miller 2023).
- Testing for discrimination or prejudice in stops is complicated by the "benchmarking problem"(Grogger & Ridgeway 2006). In the case of traffic stops, the only data that is recorded is stops that were made, not potential stops backed by prejudice or discrimination.
- Based on a study done in North Carolina, between the six cities the study examined, the most common type of stop was speed related (Gasnick 2024). Theoretically, officers can pull someone over even if they are only 1 mph over the speed limit.

Research Questions

- How does the ratio of speed related stops compare in low-income neighborhoods to high-income neighborhoods?
- How do speed related stops compare in low-income neighborhoods to high-income neighborhoods and are there disparities in the dispositions of the stops?

Methods

Sample

- Data was drawn from CT Traffic Stops - Racial Profiling Prohibition Project, representing all traffic stops(n = ~1,000,000) recorded and properly filed in the year 2018.
- The data was then subset for Speed Related stops due to look at the most common type of stop.

Measures

- The location of the stop was recorded in each traffic stop report in the data set.
- Median income, which is analyzed by the city in which the stop occurred, is examined in relation to the reason for stop whether that is speed related, traffic control signal, administrative offense, etc.
- The reason and disposition of the stops where also both recorded in each traffic stop report. The dispositions were coded by the first letter of the results(i.e U = Uniform Arrest)

Results

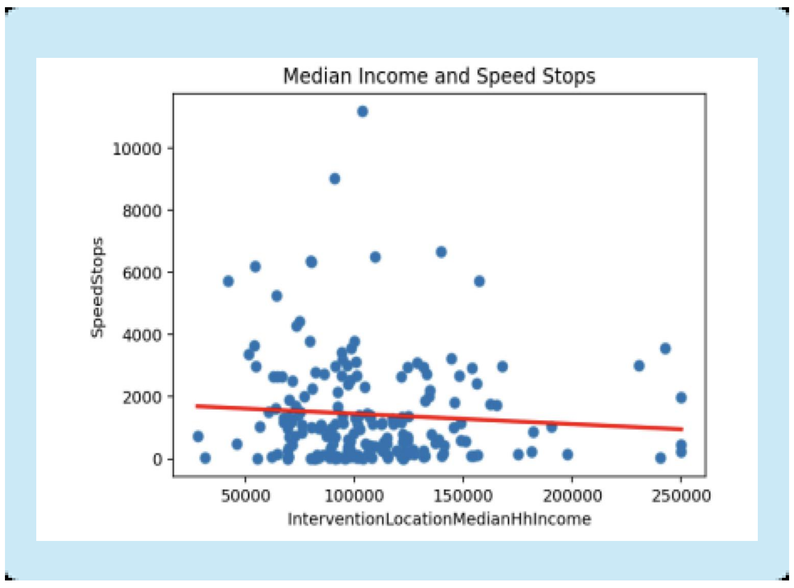
Univariate

- 3.3% of all traffic stops in Connecticut occur in New Haven(MI = $54,305)
- 28% of all traffic stops in Connecticut are speed related
- Roughly 78% of all traffic stops in Connecticut result in verbal warnings or infractions.

Bivariate

- A Pearson correlation test showed that there is a relationship between the amount of speed stops and a towns median income, with a p value of 0.0
- The analysis shows a statistically significant($p < 0.001$) but weak negative correlation between median household income and the number of speeding stops (Figure 1), meaning higher-income areas tend to have slightly fewer stops. However, the relationship is small, suggesting other factors like population or police force size may play a larger role.

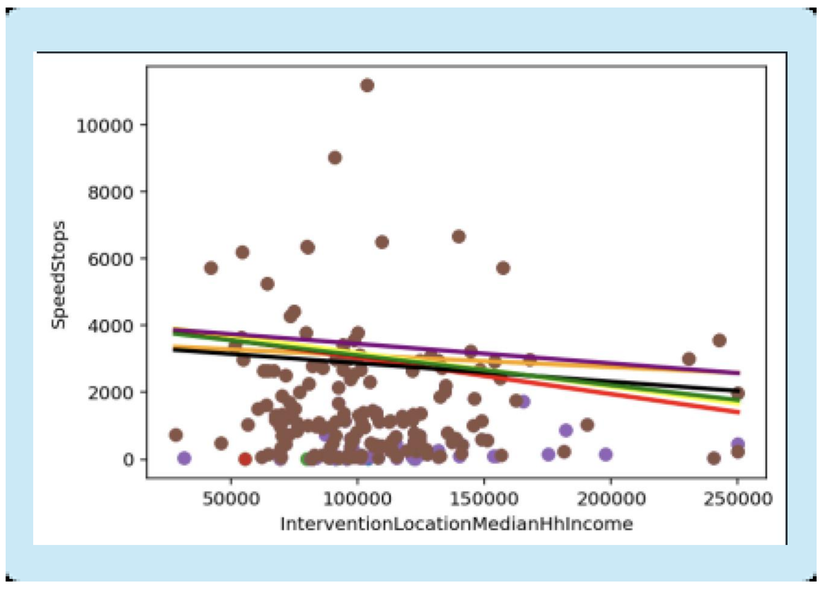
Figure 1. A Cities Median Income and Speed Related Stops



Multivariate

- A multiple linear regression test controlling for each disposition revealed that different dispositions show varying degrees of association with income. However, the low R-squared value (0.019) indicates that income and disposition only explain a very small portion of the variation in speed stops, suggesting other factors may be driving the trends.

Figure 2. A Cities Median Income and Speed Related Stops, and the dispositions of the stops.



- Therefore, we can say that disposition does not directly affect the relationship between speed stops and median income.
- The graph shows a general trend where the number of speed stops decreases as the median household income of the intervention location increases(Figure 2).
- The pattern holds across all stop dispositions, though the steepness of the decline varies (Figure 2).
- Stops resulting in verbal warnings and written warnings seem to be more common in lower-income areas, while higher-income areas see fewer stops overall.

Discussion

- The median income of a city does affect traffic stops and their dispositions, but the relationship is very weak.
- Regardless of a Cities' median income, intuitively, the cities that are more urban with larger populations tend to of course have a greater frequency of stops.
- Law enforcement agencies and branches might use this information to address and prevent disparities in traffic stops based off the assumption of a driver's income due to the location of the stop.
- Further research is needed to determine if a cities median income affects traffic stops, including taking a closer look at a city's populations, all types of traffic stops, not just speed related, and calculating stops per capita. That would most likely result in better findings.

Chenane, J. L., Wright, E. M., & Gibson, C. L. (2019). Traffic stops, race, and perceptions of fairness. Policing and Society, 30(6), 720–737. https://doi.org/10.1080/10439463.2019.1587436
Feigenberg, B., & Miller, C. (2023). Class Disparities and Discrimination in Traffic Stops and Searches. https://econ.uic.edu/wp-content/uploads/sites/283/2023/08/FM_Class_Based_Profiling.pdf
Grogger, J., & Ridgeway, G. (2006). Testing for Racial Profiling in Traffic Stops From Behind a Veil of Darkness. Journal of the American Statistical Association, 101(475), 878–887. https://doi.org/10.1198/016214506000000168
Gasnick, A., Sarode, A. L., Avanti Badrinathan, Ho, V. P., Tisch, D. J., & Towe, C. W. (2024). Speed kills? Quantifying the association between police traffic stops, types of stops, and motor vehicle collisions. Injury, 55(2), 111241–111241. https://doi.org/10.1016/j.injury.2023.111241