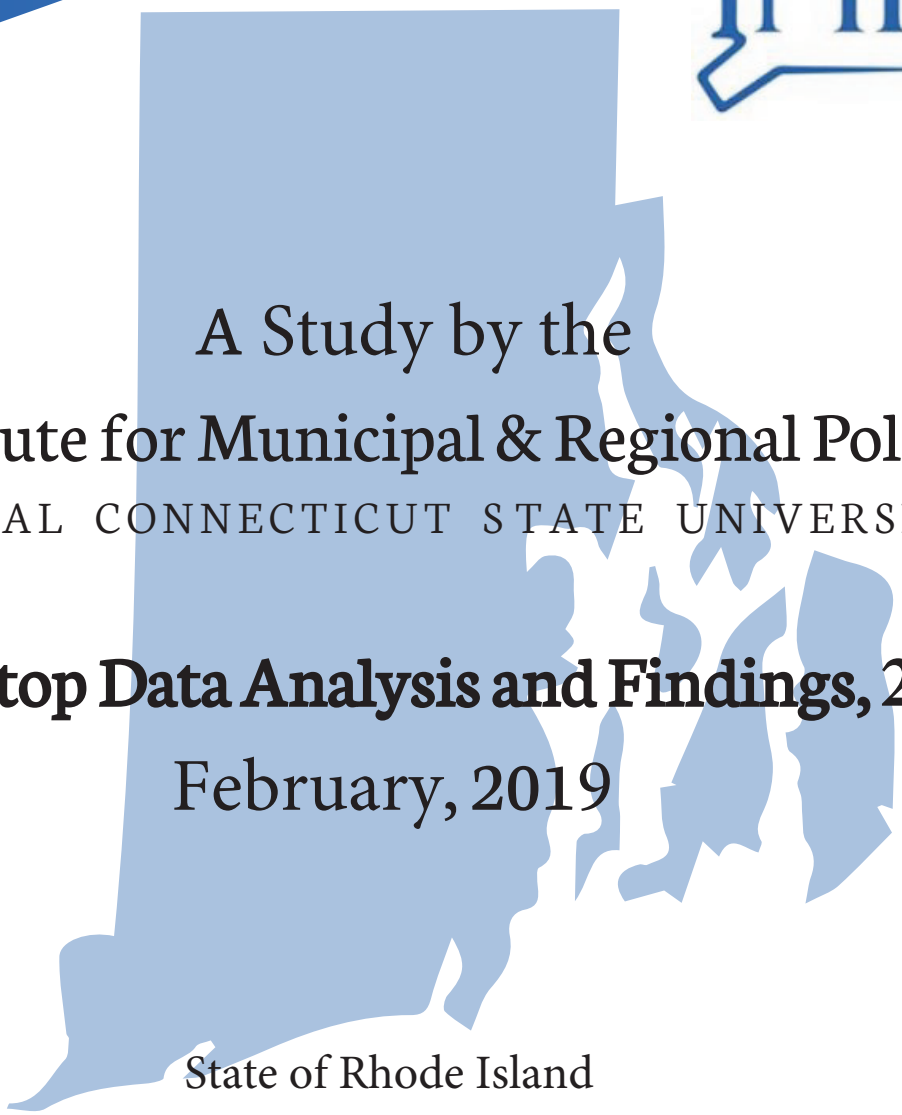

A Study by the

Institute for Municipal & Regional Policy

CENTRAL CONNECTICUT STATE UNIVERSITY

Traffic Stop Data Analysis and Findings, 2017

February, 2019

State of Rhode Island

Comprehensive Police-Community Relationship Act of 2015 (CCPRA)

Disclaimer

The Institute for Municipal and Regional Policy (IMRP) at Central Connecticut State University (CCSU) is the author of this report. The Representations, opinions, findings, and/or conclusions contained in this report are those of the authors and do not necessarily reflect the official policies or positions of the Rhode Island Department of Transportation.

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EXECUTIVE SUMMARY OF FINDINGS

On July 10, 2015 Governor Gina Raimondo signed House Bill, 2015-H 5819 Sub A, and Senate Bill, 2015-S 669 as Amended into law (R.I. Gen. Laws § 31-21.2-1 et seq.) The law, also known as the Comprehensive Police-Community Relationship Act of 2015 (CCPRA) "honors the community's desire for just stop and search procedures, while permitting law enforcement to maintain public safety and implement best practices."[1] One component of CCPRA requires the Rhode Island department of transportation to "conduct a study of routine traffic stops by the Rhode Island state police and each municipal police department in order to determine whether racial disparities in traffic stops exist, and to determine whether searches of vehicles and motorists are being conducted in a disparate manner." The following report is produced in fulfillment of this requirement.

CCPRA requires Rhode Island police departments to collect and report information on all traffic stops. Traffic stop data collection is completed for each routine traffic stop. The officer, directly following the stop, typically collects the information electronically. There are a total of sixteen data elements collected which gather information on the driver (race, ethnicity, age, gender) and the traffic stop (time of day, result of stop, search, etc.). Data is then sent to the Rhode Island Department of Transportation (RIDOT) where, on a quarterly basis, a summary report of the monthly data provided by each department and the state police is published.

This report presents the results from an analysis of approximately 250,000 traffic stops conducted between January 1, 2017 and December 31, 2017 by 37 municipal police departments[2], the Rhode Island State Police and two special police agencies[3]. This is the second analysis conducted by the Institute for Municipal and Regional Policy (IMRP) at Central Connecticut State University (CCSU) in Rhode Island. The findings presented in this report are the first step – essentially the foundation – of a process to better understand how enforcement of traffic laws impact segments of Rhode Island's driving population. These initial analyses serve as a screening tool, essentially highlighting areas where disparities between races and ethnicities are greatest in traffic enforcement throughout the state, thereby providing guidance as where researchers, law enforcement administrators, community members and other appropriate stakeholders can focus resources on those departments displaying the greatest level of disparities in their respective stop data.

It is important that readers understand the context of the findings in this report. There are many reasons for disparities to exist. We suggest that further analysis be conducted on those specific departments mentioned in this report. By examining factors such as the location of accidents, call for service records, crime patterns, and areas of major traffic generators, readers will gain a better understanding of the nature of policing and the variety of factors that influence traffic enforcement in each individual community. A department specific analysis can better help policymakers, citizens and law enforcement best come together to understand and address the disparities present in those departments' traffic stops.

[1] http://www.dot.ri.gov/community/CCPRA/index.php

[2] The New Shoreham Police Department did not report traffic stop information during this period.

[3] The two special police agencies are the University of Rhode Island and the Department of Environmental Management.

Although we suggest that additional research on those specific departments identified in this report, all departments and communities would benefit from carefully reviewing the findings in this report. Addressing statewide racial and ethnic disparities will require a collective effort of all law enforcement and community stakeholders. An atmosphere of open-mindedness, empathy, and honesty from all stakeholders remains necessary to create sustained police legitimacy and a safer, more just society.

The authors of this report are hopeful that the information contained herein will be valuable to the citizens of Rhode Island as they seek to fulfill the promise of the Comprehensive Police-Community Relationship Act of 2015. We are both humbled and grateful for the opportunity to be part of this important effort.

E.1: THE METHODOLOGICAL APPROACH OF THE ANALYSIS

Assessing racial disparities in policing data has been used for the last two decades as a policy tool to evaluate whether there exists the possibility that racial and ethnic bias is occurring within a given jurisdiction. The statistical evaluation of policing data in Rhode Island is an important step towards developing a transparent dialogue between law enforcement and the public at large. As such, it is the goal of this report to present the results of that evaluation in the most transparent and unbiased manner possible.

The research strategy underlying the statistical analysis presented in this report was developed with three guiding principles in mind. Each principle was considered throughout the research process and when selecting the appropriate results to display publicly. A better understanding of these principles helps to frame the results presented in the technical portions of the analysis. In addition, by presenting these principles at the onset of the report, readers have a better context to understand the overall framework of the approach.

> *Principle 1: Acknowledge that statistical evaluation is limited to finding racial and ethnic disparities that are indicative of racial and ethnic bias but that, in the absence of a formal procedural investigation, cannot be considered comprehensive evidence.*
>
> *Principle 2: Apply a holistic approach for assessing racial and ethnic disparities in Rhode Island policing data by using a variety of approaches that rely on well-respected techniques from existing literature.*
>
> *Principle 3: Outline the assumptions and limitations of each approach transparently so that the public and policy makers can use their judgment in drawing conclusions from the analysis.*

Seven distinct analytical tools were used to evaluate whether racial and ethnic disparities are present in the Rhode Island policing data. In the analysis, the demography of motorists was grouped into four overlapping categories to ensure a large enough sample size for the statistical analysis. Although much of the analysis focuses on stops made of black (Hispanic or non-Hispanic) and Hispanic motorists (any race), the analysis was also conducted for aggregated groupings of all non-white motorists (Hispanic or non-Hispanic) as well as a combined sample of black and Hispanic motorists. In terms of identifying departments or state police barracks in individual tests, the estimated disparity (i.e. the higher likelihood of stopping a minority motorist) must have been estimated with at least a 95 percent level of statistical

significance for either black or Hispanic motorists alone. Put simply, under the rigorous conditions set by each test, there must have been at least a 95 percent chance that either black or Hispanic motorists were more likely to be stopped (or searched) at a higher rate relative to white non-Hispanic motorists.

First, a method referred to as the Solar Visibility analysis, also known as Veil of Darkness, was used to assess the existence of racial and ethnic disparities in stop data. The test is a statistical technique that was developed by Jeffery Grogger and Greg Ridgeway (2006) and published in the *Journal of the American Statistical Association*. The Solar Visibility analysis examines a restricted sample of stops occurring during the "inter-twilight window" and assesses relative differences in the ratio of minority to non-minority stops that occur in daylight as compared to darkness. The inter-twilight window restricts stops to a fixed window of time throughout the year when visibility varies due to seasonality as well as the discrete daylight savings time shift. This technique relies on the idea that, if police officers are profiling motorists, they are better able to do so during daylight hours when race and ethnicity is more easily observed. After restricting the sample of stops to the inter-twilight window and controlling for things like the time of day and day of week, any remaining difference in the likelihood a minority motorist is stopped during daylight is attributed to disparate treatment. This analytical approach is considered the most rigorous and broadly applicable of all the tests presented in this report.

The second analytical tool used in the analysis is the synthetic control where the number of minority traffic stops in a given department is evaluated against a benchmark constructed using stops made by all other departments in Rhode Island. Since departments differ in terms of their enforcement activity (i.e. time of stops, reason for stops, etc.) and the underlying demographics of the population on the roadway, this analysis relies on the rich statistical literature on propensity scores. Here, a propensity score is a measure of how similar a stop made outside a given department is to a stop made by the department being analyzed. These measures of similarity are used to weight stops when constructing an individual benchmark for each department. For example, if the department being analyzed has a high minority population and makes most of their stops on Friday nights at 7PM for speeding violations then stops made for speeding violations by departments with a similar residential population at this time and day will be given more weight when constructing the benchmark. This methodology ensures that there is an apples-to-apples comparison between the number of minorities stopped in a given town relative to their benchmark and allows for the interpretation of any remaining differences to be attributed to possible disparate treatment.

The three techniques contained in Section V are descriptive in nature and compare department-level data to three benchmarks (statewide average, estimated commuter driving populations, and resident population). These methods are referred to as population benchmarks and are commonly used to evaluate racial disparities in police data across the country. The statewide average comparison provides a simple and effective way to establish a baseline for all departments from which the relative differences between department stop numbers and the average for the state are compared. A comparison to the statewide average is presented alongside the context necessary to understand differences between local jurisdictions. Next, researchers adjust "static" residential census data to approximate the estimated driving demographics in a particular jurisdiction. Residential census data can be modified to create a reasonable estimate of the possible presence of many nonresidents likely to be driving in a given community because they work there and live elsewhere. This estimate is a composition of the driving population during typical commuting hours based on data provided by the U.S. Census Bureau. The final population benchmark comparison limits the analysis to stops involving only residents of the community

and compares them to the community demographics based on the 2010 decennial census for residents age 16 and over. Although any one of these benchmarks cannot provide by itself a rigorous enough analysis to draw conclusions regarding racial disparities, if taken together with the more rigorous statistical methods they do serve as a useful tool.

The sixth analytical tool used in the analysis tests for disparities in the outcomes of traffic stops using a model that examines the distribution of dispositions conditional on race and the reason for the stop. Specifically, we test whether traffic stops made of minority motorists result in different outcomes relative to their white non-Hispanic peers. We provide one important cautionary note about interpreting this test as causal evidence of discrimination. Ideally, this test would be performed on data containing *all* violations observed by the police officer prior to making a traffic stop and where we would include a control for the number of total violations. In practice, data on traffic stops typically only contain the most severe reason that motivated the stop. In the absence of data on the full set of violations observed by police officers, we suggest that the reader interpret results from this test as providing descriptive evidence to be viewed in concert with other such empirical measures.

Lastly, an analysis of post-stop outcomes using a hit-rate approach following a technique published in the *Journal of Political Economy* by Knowles, Persico and Todd (2001). The hit-rate approach relies on the idea that motorists rationally adjust their propensity to carry contraband in response to their likelihood of being searched by police. Similarly, police officers rationally decide whether to search a motorist based on visible indicators of guilt and an expectation of the likelihood that a given motorist might have contraband. According to the model, a demographic group of motorists would be searched by police more often than white non-Hispanic motorists if they were more likely to carry contraband. However, the higher level of searches should be exactly proportional to the higher propensity for this group to carry contraband. Thus, in the absence of racial animus, we should expect the rate of successful searches (i.e. the hit-rate) to be equal across different demographic groups regardless of differences in their propensity to carry contraband. [4] In this test, discrimination is interpreted as a preference for searching minority motorists that shows up statistically as a lower hit-rate relative to Caucasian motorists. Note that this test inherently says nothing about disparate treatment in the decision to stop motorists as it is limited in scope to vehicular searches.

E.2: FINDINGS FROM THE ANALYSIS OF POLICING DATA, 2017

Across Rhode Island's municipal departments and state police barracks, 12 percent of motorists stopped during the analysis period were observed to be Black while 14.3 percent of stops were Hispanic motorists. The results from the Solar Visibility analysis indicate that stopped motorists were more likely to be minorities during daylight relative to darkness suggesting the existing of a racial or ethnic disparity in terms of the treatment of minority motorists relative to Whites. The statewide results from the Solar Visibility analysis were found to be robust to the addition of a variety of controls. The level of statistical significance remained relatively consistent when the sample is reduced to only moving violations. The

[4] Although some criticism has risen concerning the technique and extensions have suggested that more disaggregated groupings of searches be used in the test, the ability to implement such improvements is limited by the small overall sample of searches in a single year of traffic stops. Despite these limitations, the hit-rate analysis is still widely applied in practice and contributes to the overall understanding of post-stop police behavior in Rhode Island.

results from the post-stop analysis confirm that the statewide disparity carries through to post-stop behavior across all racial and ethnic groups. In aggregate, Rhode Island police departments exhibit a tendency to be less successful in motorist searches across all minority groups.

Solar Visibility Analysis Findings, 2017

The solar visibility test identified discrimination by examining changes to the odds that a stopped motorist was a minority just before and after sunset. In particular, the test relied on a quasi-experimental design, which only examined stops occurring within a fixed window of time when the timing of sunset varied throughout the year. The empirical model also controlled for factors like the day of the week and time of the day when each stop occurred. As long as police are marginally better able to detect motorist race/ethnicity in daylight and a set of additional identifying assumptions hold, the solar visibility test will identify potential discrimination from these quasi-random changes to visibility. As described in the full report, we estimate that black motorists are more likely to be stopped during daylight relative to darkness across Rhode Island. Hispanic motorists are also more likely to be stopped in daylight by State Police.

In an effort to better identify the source of these racial and ethnic disparities, the analysis was repeated at the department level. Although there is evidence of a disparity at the state level, it is important to note that it is likely that specific departments are driving these statewide trends. The threshold for identifying individual departments was the presence of a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories and have a false discovery rate of less than 10 percent. [5] The departments that were identified as having a statistically significant disparity are the largest contributors to the overall statewide results. Here, the unit of analysis is a municipal department or State Police barracks where disparities could be a function of a number of factors including institutional culture, departmental policy, or individual officers.[6]

The four municipal departments and one State Police barrack identified to exhibit a statistically significant racial or ethnic disparity include:

Barrington

Within the inter-twilight window, the Barrington municipal police department made 887 total stops of which 13.4 percent were made of minorities. Of the total stops, 6.3 percent were made of Hispanic motorists while 5.0 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1 while the odds that a stopped motorist was Hispanic increased by 5 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

[5] Put simply, there must have been at least a 95 percent chance that the motorists were more likely to be stopped at a higher rate relative to white Non-Hispanic motorists. The false discovery rate of 10 percent allows there to be a less than 10 percent chance that one of our identified estimates misidentifies a department.

[6] Since department or state police barrack estimates represent an average effect of stops made by individual officers weighted by the number of stops that they made in 2017, it is possible that officer-level disparities exist in departments which were not identified.

Cranston

Within the inter-twilight window, the Cranston municipal police department made 6,601 total stops of which 45.5 percent were made of minorities. Of the total stops, 25.4 percent were made of Hispanic motorists while 21.9 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1.3 while the odds that a stopped motorist was Hispanic increased by 1.5 during daylight. Both of these results were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

Pawtucket

Within the inter-twilight window, the Pawtucket municipal police department made 2,952 total stops of which 48.8 percent were made of minorities. Of the total stops, 24 percent were made of Hispanic motorists while 28.6 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 2.4 while the odds that a stopped motorist was Hispanic increased by 1.2 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

Tiverton

Within the inter-twilight window, the Tiverton municipal police department made 970 total stops of which 7.8 percent were made of minorities. Of the total stops, 3.8 percent were made of Hispanic motorists while 3.3 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1 while the odds that a stopped motorist was Hispanic increased by 4.9 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

RISP- Hope Valley

Within the inter-twilight window, the RISP- Hope Valley State Police barracks municipal police department made 936 total stops of which 32.6 percent were made of minorities. Of the total stops, 13.5 percent were made of Hispanic motorists while 15.4 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 2.4 while the odds that

a stopped motorist was Hispanic increased by 1.2 during daylight. Only the results for Black motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

Other Statistical and Descriptive Measure Analysis Findings, 2017

In addition to the four municipal police departments and one state police barrack identified to exhibit statistically significant racial or ethnic disparities in the Solar Visibility analysis, 18 other departments were identified using either the synthetic control method, descriptive tests, stop disposition test or KPT hit-rate analysis. Identification in any one of these tests alone is not, in and of itself, sufficient to be identified for further analysis. However, these additional tests are designed as an additional screening tool to identify the jurisdictions where consistent disparities exceed certain thresholds that appear in the data. Although it is understood that certain assumptions have been made in the design of each of these measures, it is reasonable to believe that departments with consistent data disparities that separate them from the majority of other departments should be subject to further review and analysis with respect to the factors that may be causing these differences.

The results from estimating whether individual municipal departments stopped more minority motorists relative to their requisite synthetic control found 11 municipal police departments to have a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories. However, the disparities did not persist in all 11 departments through doubly robust estimation. In total, there were only seven municipal police departments that withstood this more rigorous estimation procedure. Those departments are *Cumberland, Foster, Johnston, Lincoln, Middletown, North Smithfield, and Portsmouth.*

The descriptive tests are designed as an additional tool to identify disparities that exceed certain thresholds that appear in a series of census-based benchmarks. Those three benchmarks are: (1) statewide average, (2) the estimated commuter driving population, and (3) resident-only stops. Although 22 municipal police departments were identified with racial and ethnic disparities when compared to one or more of the descriptive measures, only *Providence*, *North Smithfield, and North Providence* exceeded the disparity threshold in more than half the benchmark areas.

The results from the Stop Disposition test shows that minority motorists stopped by municipal police departments were found to have a statistically different distribution of outcomes conditional on the basis for which they were stopped. In the departmental analysis, there were 18 of 41[7] total departments found to have a disparity in the distribution of outcomes that was statistically significant at the 95 percent level in the Black or Hispanic alone categories. However, we note that the number of violations might be correlated with more severe outcomes and race. Since this variable is unobservable in the current data, we strongly caution the reader about drawing any conclusions from this section alone. The departments identified in this test include: *Barrington, Burrillville, Central Falls, Coventry, Cranston, East Providence, Jamestown, Johnston, Lincoln, Narragansett, Newport, North Smithfield, Pawtucket, Scituate, Smithfield, Warren, West Greenwich, and Woonsocket.*

[7] 37 municipal police departments, the University of Rhode Island police, Department of Environmental Management police, and the Rhode Island State Police make-up the departments analyzed in this report.

Finally, the results of the hit-rate test applied to the aggregate search data for all departments in Rhode Island show that departments are less successful in motorist searches across all minority groups, which is a potential indicator of disparate treatment. Examine the data separately for each individual police department; there were a total of five municipal police department found to have a disparity in the hit-rate of minority motorists relative to white Non-Hispanic motorists. The disparity in each of these departments was found to be statistically significant at the 95 percent level and also fall below the threshold of a 10 percent false discovery rate.

The municipal departments identified to exhibit a statistically significant racial or ethnic disparity in searches include:

Cranston

The Cranston municipal police department was observed to have made 538 discretionary searches of which 53.9 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 27.7 percent were made of vehicles containing a Hispanic individual while 30.3 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 27 percent while that for Black motorists was 17.2 percent and Hispanic motorists was 16.8 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

East Providence

The East Providence municipal police department was observed to have made 437 discretionary searches of which 43.7 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 18.5 percent were made of vehicles containing a Hispanic individual while 30.8 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 12.6 percent while that for Black motorists was 3.2 percent and Hispanic motorists was 1.2 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

North Providence

The North Providence municipal police department was observed to have made 107 discretionary searches of which 52.3 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 23.4 percent were made of vehicles containing a Hispanic individual while 30.8 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 37.3 percent while that for Black motorists was 12.1 percent. The sample of searched Hispanic motorists did not meet the minimum necessary criteria for applying the test. The results for Black motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

Pawtucket

The Pawtucket municipal police department was observed to have made 276 discretionary searches of which 52.5 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 22.5 percent were made of vehicles containing a Hispanic individual while 31.5 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic

motorists was 41.2 percent while that for Black motorists was 4.9 percent and Hispanic motorists was 40.3 percent. The results for Black motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

Providence

The Providence municipal police department was observed to have made 1,339 discretionary searches of which 82.6 were made of vehicles containing at least one minority in 2017. Of the total searches, 42.3 percent were made of vehicles containing a Hispanic individual while 51.7 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 13.7 percent while that for Black motorists was 6.5 percent and Hispanic motorists was 7.2 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

E.3: CONCLUSIONS AND NEXT STEPS

All of the 2017 statewide traffic stop data analysis as presented in this report provides a screening tool which researchers, law enforcement administrators, community members and other appropriate stakeholders can use to focus attention and resources on those departments with the greatest level of disparities in their respective stop data. As noted previously, racial and ethnic disparities in any traffic stop analysis are not, by themselves, conclusive evidence of racial profiling. Statistical disparities do, however, present significant evidence of idiosyncratic data trends that warrant further analysis[8].

Departments and community stakeholders identified with the greatest level of disparities could benefit from additional analysis. It is important to keep in mind that traffic stop disparities can be influenced by many local factors such as the location of accidents, high call for service volume areas, high crime rate areas, and areas with major traffic generators like shopping and entertainment districts, to name a few. Additionally, neighborhood demographics can vary greatly within a community. Additional considerations for a department's and community's unique characteristics would give the department and public a better understanding of why and how disparities exist.

In order to determine if a department's racial and ethnic disparities are considered statistically significant, researchers reviewed the results from the five analytical sections of the report (i.e., Solar Visibility, Synthetic Control, Descriptive Statistics, Stop Disposition, and KPT Hit-Rate). The threshold for identifying significant racial and ethnic disparities for departments is described in each section of the report (e.g., departments with a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories in the Solar Visibility methodology were identified as statistically significant). Departments should consider additional analysis if they meet any one of the following criteria:

1. A statistically significant disparity in the solar visibility analysis
2. A statistically significant disparity in the synthetic control analyses and any one of the following analyses:
    a. Descriptive statistics

[8] Following the 2016 annual report, the authors of this report conducted additional in-depth analyses of departments identified with statistical disparities. Due to the timing of the release of the 2017 report, no additional analysis is planned.

b. Stop disposition
c. KPT-hit rate

3. A statistically significant disparity in the descriptive statistics, stop disposition, and KPT hit-rate analyses.

Based on the above-listed criteria, the following departments: **(1) Barrington, (2) Johnston, (3) Lincoln, (4) Pawtucket, (5) Providence** and **(6) Tiverton** could benefit from additional research. Although additional analysis was conducted for Providence based on the 2016 data, both the size and the relative consistency of the disparities regarding black drivers in the Providence patrol districts caused some concern. However, at the time, it was difficult to draw meaningful conclusions about the disparities, given some limitations in the dataset and collection errors that occurred during the 2016 study year. Therefore, we concluded that additional analysis could benefit Providence and help them determine if the first year analysis results are repeated over time.

Cranston and North Smithfield were also identified with racial and ethnic disparities in this study as well as in the 2016 annual analysis; however, we do not believe additional analysis is necessary. An in-depth follow-up analysis, with recommendations, was conducted following the 2016 study for both departments. Though the racial and ethnic disparities have remained consistent in each of the annual studies for Cranston and North Smithfield, further understanding of traffic stop enforcement in those towns indicate only that the departments should continue to review and monitor traffic enforcement policies to evaluate the disproportionate effect they could be having on minority drivers. They should also continue to take steps to assure that their minority community is fully engaged in the process of understanding the rationale for the allocation of enforcement resources and what outcomes are being achieved.

Lastly, the Rhode Island State Police Hope Valley Barracks was also identified with racial and ethnic disparities in this study as well as the 2016 annual analysis. However, upon further review of the 2016 data, researchers determined that stops that occurred outside the boundaries of the barracks caused the disparity. When an officer assigned to the Hope Valley Barracks conducts a stop in another patrol area it was reported as a stop conducted within the Hope Valley patrol area. After modifying this study to address the issue of reporting location data, there was still a racial and ethnic disparity. We will continue to work with the Rhode Island State Police to ensure that additional data anomalies are not contributing to the disparity.

Although further analysis is important, a major objective of any review of possible racial profiling in Rhode Island is bringing law enforcement officials and community members together in an effort to build trust by discussing relationships between police and the community. Public forums should be held in each identified community to bring these groups together. They are an important tool used to inform the public of the findings and outline steps for moving forward with additional analysis. The IMRP is committed to utilizing both data and dialogue to enhance relationships between the police and their community.

I: METHODOLOGICAL APPROACH UNDERLYING THE ANALYSIS

Assessing racial disparities in policing data has been used for the last two decades as a policy tool to evaluate whether racial bias exists within a given jurisdiction. Although there has always been widespread public support for the equitable treatment of individuals of all races, recent national headlines have brought this issue to the forefront of American consciousness and prompted a contentious national debate about policing policy. The statistical evaluation of policing data in Rhode Island is an important step towards developing a transparent dialogue between law enforcement and the public. As such, this report's goal is to present the results of that evaluation in a transparent and unbiased manner.

As an increasing number of jurisdictions have passed laws mandating the collection of policing data, researchers have become involved in the process by providing new and increasingly sophisticated analytical techniques. Prior to the development of these empirical methods, traditional policing data assessments relied principally on population-based benchmarks. Although population-based benchmarks are still frequently applied in practice because of their intuitive appeal and inherent cost-effectiveness, these test statistics cannot withstand strict scrutiny. In an effort to achieve the goal of a transparent and unbiased evaluation, the analysis in this report applies a series of sophisticated econometric tests as the primary diagnostic mechanism.

The research strategy underlying this statistical analysis was developed with consideration to three guiding principles. Each principle served as an important foundation for the research process, particularly when selecting the appropriate results to disseminate to the public. A better understanding of these principles helps to frame the results in the technical portions of the analysis. Further, presenting these principles at the outset of the report provides readers with the appropriate context to understand our overall approach.

> *Principle 1: Acknowledge that statistical evaluation is limited to finding racial and ethnic disparities that are indicative of racial and ethnic bias but that, in the absence of a formal procedural investigation, cannot be considered comprehensive evidence.*
>
> *Principle 2: Apply a holistic approach for assessing racial and ethnic disparities in Rhode Island policing data by using a variety of approaches that rely on well-respected techniques from existing literature.*
>
> *Principle 3: Outline the assumptions and limitations of each approach transparently so that the public and policy-makers can use their judgment in drawing conclusions from the analysis.*

This report is organized to lead the reader through a host of descriptive and statistical tests that vary in their assumptions and level of scrutiny. The intent behind this approach is to apply multiple tests as a screening filter for the possibility that any one test (1) produces false positive results or (2) reports a false negative. Seven distinct analytical tools were used to evaluate whether racial and ethnic disparities are present in the Rhode Island policing data. In the analysis, the demography of motorists was grouped into four overlapping categories to ensure a large enough sample size for the statistical analysis. Although much of the analysis focuses on stops made of black (Hispanic or non-Hispanic) and Hispanic motorists

(any race), the analysis was also conducted for aggregated groupings of all non-white motorists (Hispanic or non-Hispanic) as well as a combined sample of black and Hispanic motorists. In terms of identifying departments or state police barracks in individual tests, the estimated disparity (i.e. the higher likelihood of stopping a minority motorist) must have been estimated with at least a 95 percent level of statistical significance for either black or Hispanic motorists alone. Put simply, under the rigorous conditions set by each test, there must have been at least a 95 percent chance that either black or Hispanic motorists were more likely to be stopped (or searched) at a higher rate relative to Caucasian non-Hispanic motorists.

The analysis begins by first presenting the analysis of racial and ethnic disparities in the rate of motor vehicle stops by applying a well-respected methodology colloquially known as the "Veil of Darkness." It is referred to as the Solar Visibility analysis in this report. The next method illustrates the application of the synthetic control analysis that has the same intuitive appeal as traditional population-based benchmarks but remains grounded in rigorous statistical theory. The third component of the analysis uses descriptive statistics from the Rhode Island policing data along with several intuitive measures that evaluate racial and ethnic disparities. These intuitive measures are considered less stringent tests, but provide a useful context for viewing the data.

The last two sections of the report assesses post-stop behavior, particularly differences in stop outcomes and the incidence of vehicular searches. The report is concluded by summarizing our analysis of disparities in the rate of motor vehicle stops and post-stop behavior at the state and department-levels. The findings presented in the conclusion draw from each of our evaluation mechanisms and identify only those departments where statistically significant racial and ethnic disparities across multiple tests are observed. Detailed descriptions of all methodologies can be found in Appendix A.

In short, we move forward with the overall goal of identifying the statistically significant racial and ethnic disparities in Rhode Island policing data. A variety of statistical tests are applied to the data in the hope of providing a comprehensive approach based on the lessons learned from academic and policy applications. Our explanations of the mechanisms and assumptions that underlie each of the tests are intended to provide policymakers and the public with enough information to assess the data and draw their own conclusions from the findings.

Finally, we emphasize the message that any statistical test is only truly capable of identifying racial and ethnic disparities. Such findings provide a mechanism to indicate possible racial profiling but they cannot, without further investigation, provide sufficient evidence that racial profiling exists.

II: CHARACTERISTICS OF TRAFFIC STOP DATA

This section examines general patterns of traffic enforcement activities in Rhode Island for the study period of January 1, 2017 to December 31, 2017. Statewide information can be used to identify variations in traffic stop patterns to help law enforcement and local communities understand more about traffic enforcement. Although some comparisons can be made between similar communities, we caution against comparing agencies' data in this section of the report. Please note that the tables included in this report present information from only a limited number of departments. Complete tables for all agencies are included in the technical appendix B.

In Rhode Island, more than 255,000 traffic stops were conducted during the 12-month study period. Almost 84 percent of the total stops were conducted by the 37 municipal police departments, 15 percent of the total stops were conducted by state police, and the remaining 1 percent of stops were conducted by the two special police agencies[9]. Figure 1 shows the aggregate number of traffic stops by month along with each demographic category. As can be seen below, the volume of traffic stops varies seasonally.

Figure 1: Aggregate Traffic Stops by Month of the Year

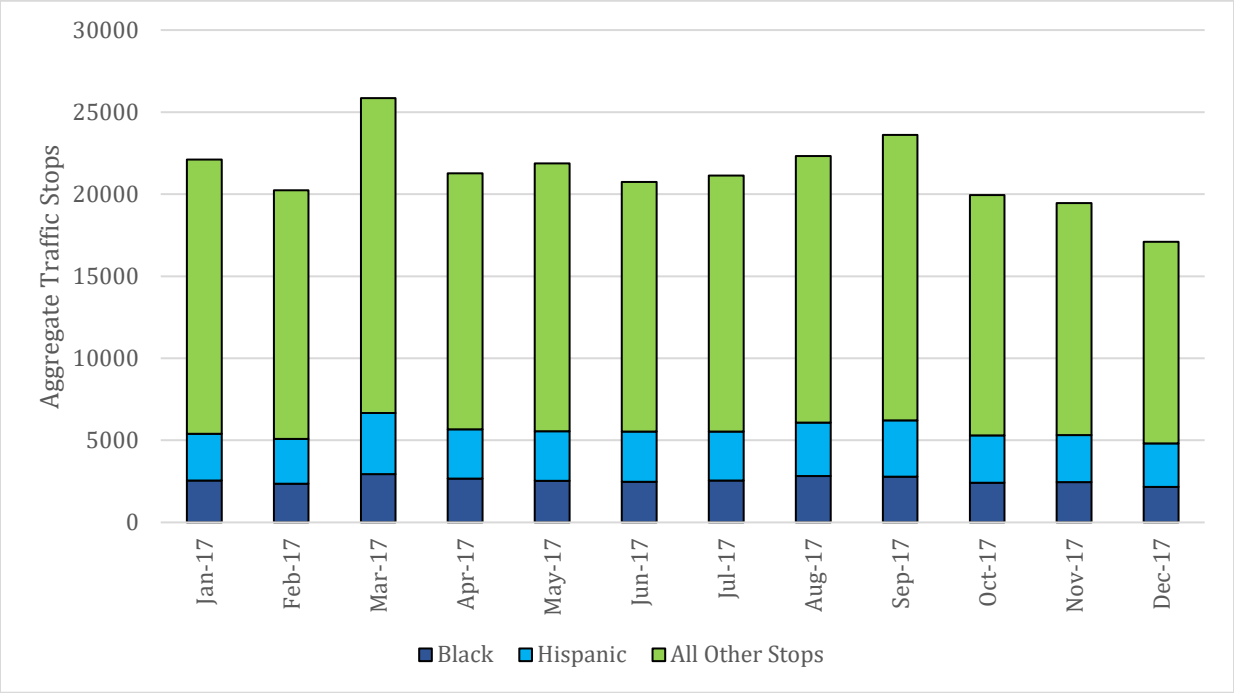


Figure 2 displays traffic stops by time of day for the entire analysis period. As can be seen from the figure, the total volume of traffic stops fluctuates significantly across different times of the day. The highest hourly volume of traffic stops in the sample occurred from five to six in the evening and accounted for 6.4 percent of all stops. It is not surprising that the volume of traffic stops increases between these hours as this is a peak commuting time in Rhode Island. The lowest volume of traffic stops occurred between four and five in the morning and continued at a suppressed level during the morning commute. The low level of traffic stops during the morning commute is likely due to an interest in maintaining a smooth flow of

[9]The special police agencies are the University of Rhode Island and the Department of Environmental Management.

traffic during these hours. However, traffic enforcement does increase following morning commutation hours between 9:00 a.m. and 11:00 a.m.

The evening commute, in contrast to the morning commute, represents a period when a significant proportion of traffic stops are made. The surge seen between the hours of four and seven at night represents a significant period of traffic enforcement. In aggregate, stops occurring between these hours represented 17.2 percent of total stops.

Figure 2: Aggregate Traffic Stops by Time of Day

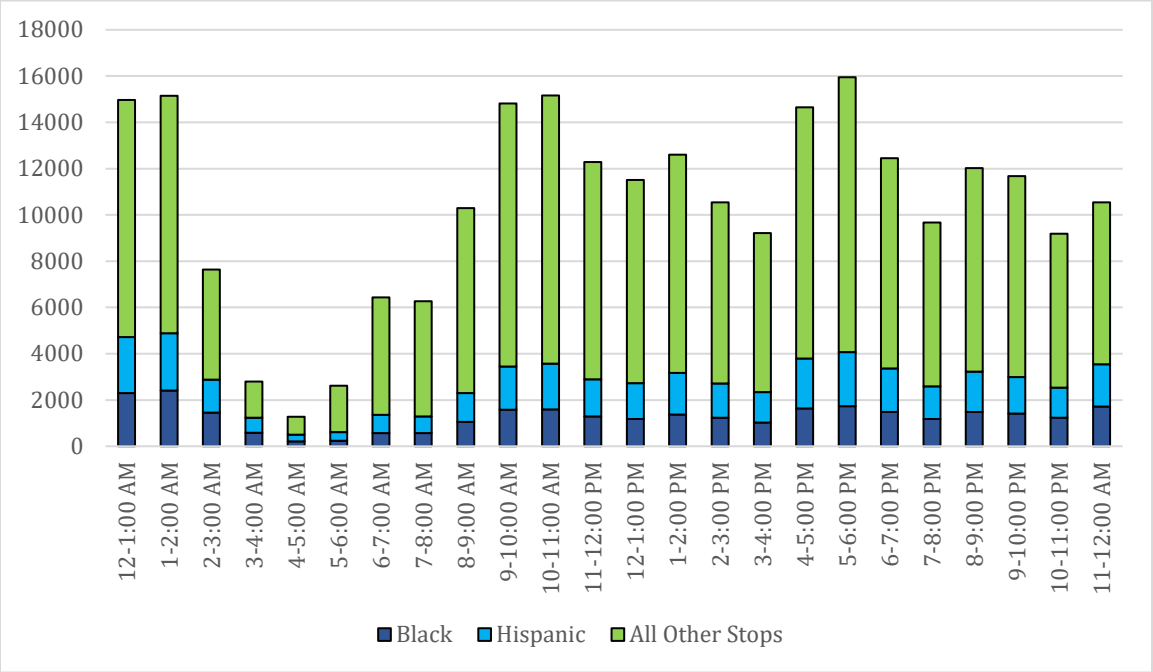
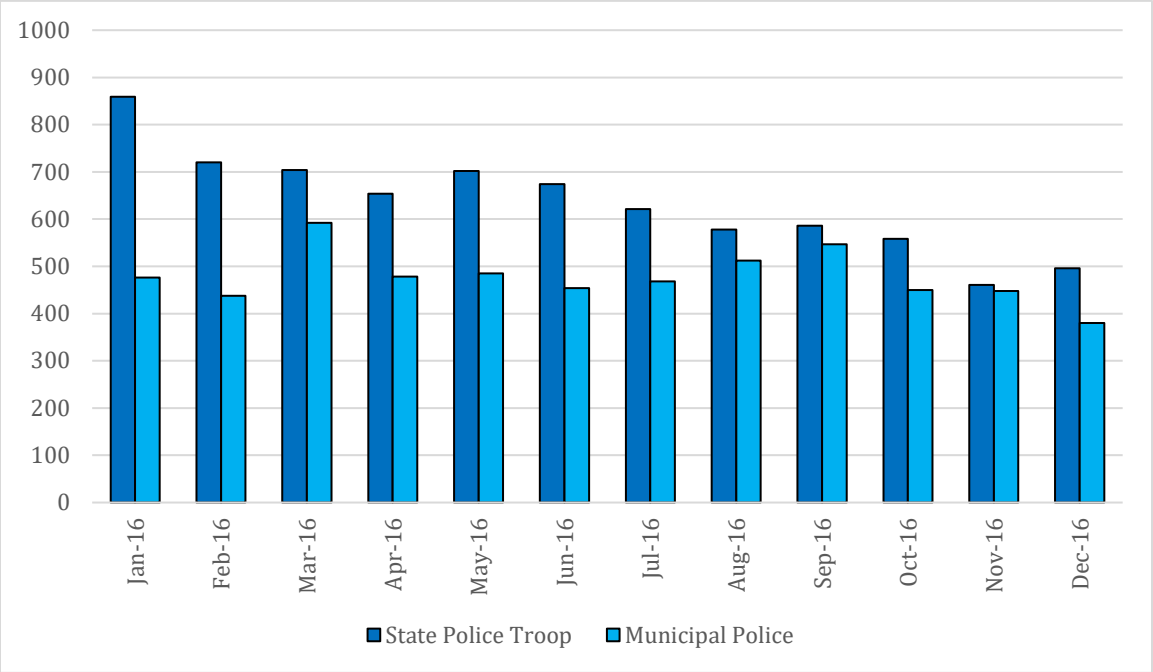


Figure 3 illustrates the average number of traffic stops by month for municipal police agencies and the state police. The data illustrates that municipal traffic stops peaks in March and September. The average number of traffic stops for municipal department's ranges from 380 to 592 each month for each agency. State police traffic stops by barracks are stable each month and range from a low of 461 to a high of 859.

Figure 3: Average Number of Traffic Stops by Month for Police Agencies



The level of and reason for traffic stop enforcement varies greatly across agencies throughout the state for a number of reasons. For example, some enforcement is targeted to prevent accidents in dangerous areas, combat increased criminal activity, or respond to complaints from citizens. Those agencies with active traffic units may produce a higher volume of traffic stops. The rate of traffic stops per 1,000 residents in the population helps to compare the stop activity between agencies. The five municipal police agencies with the highest stop rate per 1,000 residents are Portsmouth, Foster, Little Compton, Cranston, and Barrington. Conversely, Providence, Lincoln, Woonsocket, Warwick, and West Greenwich have the lowest rate of stops per 1,000 residents. Table 1 shows the distribution of stops for the highest and lowest level of enforcement per 1,000 residents for police agencies.

Table 1: Municipal Police, Highest and Lowest Rates of Traffic Stops

Town Name	16+ Population*	Traffic Stops	Stops per 1,000 Residents
Rhode Island	857,232	251,186	293
Municipal Departments with the Highest Rate of Traffic Stops			
Portsmouth	13,947	7,668	550
Foster	3,790	1,985	524
Little Compton	2,925	1,396	477
Cranston	66,140	27,273	412
Barrington	12,367	4,958	401
Narragansett	13,937	5,466	392
Charlestown	6,524	2,529	388
Middletown	12,911	4,756	368
Tiverton	13,168	4,807	365
North Smithfield	9,857	3,554	361
Municipal Departments with the Lowest Rate of Traffic Stops			
Providence	141,451	15,340	108
Lincoln	16,995	1,957	115
Woonsocket	32,349	5,417	167
Warwick	68,889	12,019	174
West Greenwich	4,854	904	186
Cumberland	26,946	5,035	187
West Warwick	24,051	4,804	200
South Kingstown	25,974	5,506	212
North Providence	27,300	5,816	213
East Greenwich	10,202	2,258	221

* The population 16 years of age and older was obtained from the United States Census Bureau 2010 Decennial Census.

Table 2 presents some basic demographic data on persons stopped in Rhode Island between January 1, 2017 and December 31, 2017. Nearly two-thirds (63.1 percent) of motorists stopped were male. Almost half (45 percent) of motorists stopped were under the age of 30 compared to 20 percent over 50. The vast

majority of stops in Rhode Island were white non-Hispanic motorists (71.1 percent); 12.2 percent were black non-Hispanic motorists; 14.5 percent were Hispanic motorists; and 2.2 percent were all other races non-Hispanic motorists.

Table 2: Statewide Driver Characteristics

Race and Ethnicity		Gender		Residency		Age	
White	71.21%	Male	63.1%	Resident	28.8%	16 to 20	10.3%
						21 to 30	35.0%
Black	12.2%					31 to 40	20.3%
						41 to 50	13.8%
Hispanic	14.5%	Female	36.9%	Non-Resident	71.2%	51 to 60	12.0%
						Older than 61	8.36%
Other	2.2%						

Table 3 presents data on the characteristics of the traffic stops in the state. Most traffic stops were made for a violation of the motor vehicle laws (94 percent) as opposed to a stop made for an investigatory purpose or motorist assist. The most common violation drivers were stopped for was speeding (32.7 percent). After a driver was stopped, over 42% were given a ticket while most of the remaining drivers received some kind of a warning (50%). Statewide, less than 3 percent of traffic stops resulted in the arrest of a driver and only 4.4 percent of stops resulted in a search being conducted.

Table 3: Statewide Stop Characteristics

Reason for Stop		Basis for Stop	
Investigatory	4.4%	Speeding	32.7%
Violation	94.2%	APB	0.2%
Assist	1.4%	Call for Service	3.7%
Outcome of Stop		Equipment/Inspection Violation	19.5%
		Motorist Assist	0.6%
Citation	42.4%	Other Traffic Violation*	28.9%
Warning	49.9%	Registration Violation	5.8%
Notice and Demand	1.2%	Seatbelt Violation	6.2%
Arrest Driver	2.6%	Suspicious Person	1.2%
Arrest Passenger	0.2%	Violation of Ordinance	0.7%
No Action	3.7%	Warrant	0.1%
Search Conducted	4.4%	Special Detail/Directed Patrol	0.5%

*If a stop was made for a reason other than one of the 11 categories listed as the basis for the stops, it is recorded as "other traffic violation." Some examples of stops that might be recorded as "other traffic violation" include a traffic light violation or stop sign violation.

In addition to the difference in the volume of traffic stops across communities, agencies stopped motorists for a number of different reasons. Police record the reason that lead to the motor vehicle stop. Those reasons are identified in 12 categories from speeding to registration violation to seatbelt violation. Although speeding is the most often cited reason for stopping a motor vehicle statewide, the results vary by jurisdiction. The average municipal police department stops for speeding violations was 41 percent compared to the state police average of 33 percent. In 10 departments, more than 50 percent of the

traffic stops were for speeding violations. On the other hand, four departments stopped motorists for speeding less than 20 percent of the time. Table 4 shows the top 10 departments where speeding (as a percentage of all stops) was the most common reason for the traffic stop.

Table 4: Highest Speeding Stop Rates across All Departments

Department Name	Total Stops	Speeding Violations
Glocester	2,368	81.0%
Foster	1,985	77.4%
West Greenwich	904	65.7%
Scituate	2,828	65.3%
Burrillville	4,295	64.5%
Charlestown	2,529	62.0%
Richmond	1,566	59.0%
Hopkinton	2,265	56.2%
Jamestown	1,407	55.6%
North Kingstown	5,206	50.0%

Other traffic violations are the next largest category for stopping motorists in Rhode Island. Although it is not clear what the specific "other" violation is, if a stop was made for a reason other than one of the 11 categories listed as the basis for the stops, it is recorded as "other traffic violation". As an example, this can include stops for traffic light violations or stop sign violations. Statewide over 28 percent of all motorists were stopped for this reason. Table 5 presents the top 10 departments with the highest percentage of stops for other traffic violations.

Table 5: Highest Other Traffic Violation Rates across All Departments

Department Name	Total Stops	Other Traffic Violation
Newport	6,544	47.6%
Pawtucket	14,360	47.2%
University of Rhode Island	898	41.4%
Providence	15,340	40.2%
Cranston	27,273	39.5%
Woonsocket	5,417	37.8%
Bristol	6,817	35.9%
Warwick	12,019	33.9%
Central Falls	3,974	33.6%
Narragansett	5,466	31.7%

Some communities throughout the country have expressed concern about the stops made for violations that are perceived as more discretionary in nature; therefore potentially making the driver more susceptible to possible police bias. Those stops are typically referred to as pretext stops and might include stops for defective lights, excessive window tint, or a display of plate violation each of which, though a possible violation of state law, leaves the police officer with considerable discretion with respect to actually making the stop. Equipment and inspection related violations were the third most common reason for stopping a vehicle in the state. A statewide combined average for stopping a motorist for an

equipment or inspection violation is 19.5 percent. Fifteen police departments exceeded the statewide average. Table 6 presents the top 10 departments with the highest percentage of stops for equipment or inspection violations.

In communities with a larger proportion of stops due to these violations, it is recommended that the departments be proactive in discussing the reasons for these stops with members of the community and examine for themselves whether or not such stops produce disparate enforcement patterns.

Table 6: Highest Equipment/Inspection Violation Rates across All Departments

Department Name	Total Stops	Equipment/Inspection Violations
North Smithfield	3,554	36.7%
North Providence	5,816	35.5%
Coventry	7,195	30.5%
Newport	6,544	28.4%
East Providence	10,153	28.2%
Cranston	27,273	27.1%
Little Compton	1,396	26.9%
RISP-HQ	2,188	26.2%
Barrington	4,958	25.8%
Portsmouth	7,668	24.2%

Many have argued that it is difficult for police to determine the defining characteristics about a driver prior to stopping and approaching the vehicle. Similar to variations found across departments for the reason for the traffic stop, there are variations that occur with the outcome of the stop. These variations illustrate the influence that local police departments have on the enforcement of state traffic laws. Some communities may view infraction tickets as the best method to increase traffic safety, while others may consider warnings to be more effective. This analysis should help police departments and local communities understand their level and type of traffic enforcement when compared to other communities.

Half of all motorists stopped in Rhode Island received a warning, while 42 percent received a citation. Individual jurisdictions varied in their post-stop enforcement actions. Johnston issued infraction tickets in 77 percent of all traffic stops, which is the highest in the state. Newport only issued infraction tickets in 7 percent of all traffic stops, which is the lowest rate in the state. For state police, officers assigned to the Lincoln Barracks issued the highest infractions (64 percent) and the Headquarters Barracks issued the lowest number of infractions (55 percent). Table 7 presents the highest infraction rates across all departments.

Table 7: Highest Citation Rates across All Departments

Department Name	Total Stops	Citations Issued
Johnston	5,348	76.9%
Pawtucket	14,360	76.7%
North Providence	5,816	71.4%
Central Falls	3,974	64.5%
RISP- Lincoln	10,980	64.0%
RISP-Hope Valley	8,148	59.6%
Smithfield	5,279	58.6%
RISP- Chepachet	6,927	58.1%
Glocester	2,368	57.5%
RISP- Wickford	9,831	57.2%

On the other hand, Newport issued warnings 92 percent of the time (the highest rate) and Rhode Island State Police Headquarters Barracks issued warnings 11 percent of the time (the lowest rate). Table 8 presents the highest warning rates across all departments.

Table 8: Highest Warning Rates across All Departments

Department Name	Total Stops	Warnings Issued
Newport	6,544	92.5%
Little Compton	1,396	88.0%
Charlestown	2,529	76.9%
Barrington	4,958	73.3%
Coventry	7,195	73.2%
Jamestown	1,407	72.9%
Foster	1,985	72.7%
Burrillville	4,295	70.8%
South Kingstown	5,506	67.1%
Cranston	27,273	66.4%

Statewide, less than 3 percent of all traffic stops resulted in the driver being arrested and less than 0.5 percent of passengers were arrested. As with infraction tickets and warnings, municipal departments varied in the percentage of arrests associated with traffic stops. The North Smithfield Police Department arrested the most people as a result of a traffic stop, with 9 percent of all stops resulting in an arrest. Table 9 presents the highest arrest rates across all departments.

Table 9: Highest Arrest Rates across All Departments

Department Name	Total Stops	Arrests
North Smithfield	3,554	8.9%
Cumberland	5,035	6.8%
Warwick	12,019	6.0%
Providence	15,340	6.0%
Woonsocket	5,417	5.5%
West Warwick	4,804	5.1%
Narragansett	5,466	5.0%
DEM	263	4.9%
Central Falls	3,974	4.9%
RISP-Headquarters	2,188	4.3%

Rarely do traffic stops in Rhode Island result in the search of a vehicle, passenger or driver. During the study period, only 4.4 percent of all traffic stops resulted in a search. Although searches are rare in Rhode Island, they do vary across jurisdictions and the data provides information about enforcement activity throughout the state. Sixteen departments exceeded the statewide average for searches, but the highest percentage was found in Providence (10.7 percent), DEM (6.5% percent), and Little Compton (6.2 percent). Of the remaining departments, seven searched vehicles more than 5 percent of the time, 26 searched vehicles between 3 percent and 5 percent of the time, and the remaining departments searched vehicles less than 3 percent of the time. Table 10 presents the highest search rates across all departments.

Table 10: Highest Search Rate across All Departments

Department Name	Total Stops	Resulted in Search
Providence	15,340	10.7%
DEM	263	6.5%
Little Compton	1,396	6.2%
Woonsocket	5,417	5.7%
East Providence	10,153	5.6%
Jamestown	1,407	5.6%
Hopkinton	2,265	5.6%
Cranston	27,273	5.4%
Burrillville	4,295	5.3%
West Greenwich	904	5.1%

III: ANALYSIS OF TRAFFIC STOPS, SOLAR VISIBILITY

The Solar Visibility test of racial and ethnic disparities in police traffic stop data operates under the key assumption that police officers are marginally better able to observe the race and ethnicity of motorists during daylight relative to darkness (Grogger and Ridgeway 2006; Ridgeway 2009; Horace and Rohlin 2016; Kalinowski et al. 2017).[10] The test relies on seasonal variation in the timing of sunset as well as the discrete daylight savings time shift to compare stops made at the same time in darkness vs. daylight. The advantage of this methodology, relative to population-based benchmarks, is that it does not require any assumptions about the underlying risk-set of motorists on the roadway. Rather, the test presumes that the composition of motorists, within a restricted sample of stops, does not vary in response to changes in visibility.[11] Here, the racial composition of stops in darkness serves as a counterfactual for those made in daylight, i.e. when officers can better observe race.

More specifically, the Solar Visibility method evaluates whether there exist statistically significant disparities in the likelihood that a stopped motorists is a minority during daylight relative to darkness. As detailed explicitly in Appendix A.2, Grogger and Ridgeway (2006) illustrate that under certain conditions the odds-ratio of a stopped motorist being a minority in daylight vs. darkness is equivalent to the odds-ratio that a minority motorist is stopped during daylight vs. darkness. In a practical context, these assumptions are that variation in travel and enforcement patterns (abject of discrimination) do not change differentially by race in response to daylight. To ensure that these conditions are met, the estimates condition on time and day of week. To further control for inherent differences in daylight and darkness, the sample is restricted to the inter-twilight window, a period when solar visibility varies throughout the year (i.e. between the earliest eastern sunset and the latest western end to civil twilight). Conveniently, this window of time falls within the evening commute where we might expect the risk-set of motorists to be less susceptible to seasonal variation.

III.A: AGGREGATE ANALYSIS WITH SOLAR VISIBILITY, 2017

Table 11 presents the results from the *solar visibility method* applied at the state-level during the inter-twilight window. These results were estimated using Equation 4 of Appendix A.2 with the standard errors clustered by department. The estimates include controls for time of day, day of week, and department fixed-effects. The estimates rely on four definitions of minority status that are compared to white non-Hispanics and annotated accordingly. The minority definitions across each specification are not mutually exclusive in that the first specification includes all non-white motorists (regardless of ethnicity) while the third includes all Hispanic motorists (regardless of race). The second specification is restricted to only black

[10] The Solar Visibility approach, also known as Veil of Darkness, has recently become the new gold standard for researchers and practitioners evaluating traffic stop data. The test has been used in many jurisdictions including Oakland, CA (Grogger and Ridgeway 2006); Cincinnati, OH (Ridgeway 2009); Minneapolis, MN (Ritter and Bael 2009; Ritter 2017); Syracuse, NY (Worden et al. 2010; Worden et al. 2012; Horace and Rohlin 2016); Portland, OR (Renauer et al. 2009); Connecticut (Ross et al. 2015, 2017), Durham, NC (Taniguchi et al. 2016a); Greensboro, NC (Taniguchi et al. 2016b); Raleigh, NC (Taniguchi et al. 2016c); Fayetteville, NC (Taniguchi et al. 2016d); New Orleans, LA (Masher 2016); and San Diego, CA (Chanin et al. 2016).

[11] Note that this assumption allows for differential rates of traffic stops to exist across races and the potential for differences in guilt and driving behavior.

motorists (regardless of ethnicity, i.e. a subset of the first specification) and the fourth specification includes both black and Hispanic motorists (i.e. combines the second and third specifications).The control across all specifications includes only stops made of motorists who were observed to be white and non-Hispanic.

As shown below, the coefficient estimates are positive for black drivers and for the combined sample of black and Hispanic motorists. Thus, that the odds a stopped motorist is a minority increases during daylight. As previously mentioned and discussed in detail in Appendix A.2, we should expect that (under the assumption of a constant relative risk-set) there will be a direct correspondence between changes to the odds-ratio for stopped motorists and that of motorists at risk of being stopped. The disparity was found to be statistically significant and persists through several robustness checks including restricting the sample to moving violations, including officer rather than department fixed-effects, and the combination these alternative specifications. Estimates from these additional robustness checks are shown respectively in Table 14 as well as in Appendix C, Tables C.1 and C.4. This disparity could be the product of explicit or implicit police discrimination as well as changes to enforcement activity that are correlated with both race/ethnicity and daylight.

Table 11: Logistic Regression of Minority Status on Daylight with Department Fixed-Effects, All Traffic Stops 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.098	0.156***	0.120	0.112**
	Standard Error	(0.064)	(0.052)	(0.074)	(0.054)
Sample Size		49568	47237	47276	53653
Pseudo R^2		0.143	0.150	0.186	0.166

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

Table 12 presents the results estimated from the subsample of all municipal police departments during the inter-twilight window in 2017. As before, the results control for time of day, day of week, and department fixed-effects. Standard errors are clustered by department. Here again, the coefficient estimates are positive indicating that the odds a stopped motorist is black increases during daylight. The disparity was found to be statistically significant and persists through several robustness checks including restricting the sample to moving violations, including officer rather than department fixed-effects, and the combination these alternative specifications. Estimates from these additional robustness checks are shown respectively in Table 15 as well as in Appendix C, Tables C.2 and C.5. The estimates from Table 12 provide strong evidence suggesting that there is a disparity in the rate that minority motorists are stopped by municipal police. As noted previously, this disparity could be the product of explicit or implicit police discrimination as well as changes to enforcement activity that are correlated with both race/ethnicity and daylight.

Table 12: Logistic Regression of Minority Status on Daylight, Municipal Traffic Stops 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.075	0.135**	0.118	0.105*
	Standard Error	(0.070)	(0.056)	(0.081)	(0.059)
Sample Size		45407	43664	43765	49487
Pseudo R^2		0.143	0.162	0.199	0.178

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

Table 13 presents the results estimated from a subsample of all State Police barracks during the inter-twilight window in 2017. As before, the results control for time of day, day of week, and department fixed-effects. Standard errors are clustered by barrack. Here again, the coefficient estimates are positive indicating that the odds a stopped motorist is black increases during daylight. However, the results also indicate the presence of a disparity for Hispanic motorists. These disparities were found to be statistically significant and persists through several robustness checks including restricting the sample to moving violations, including officer rather than barracks fixed-effects, and the combination these alternative specifications. Estimates from these additional robustness checks are shown respectively in Table 15 as well as in Appendix C, Tables C.3 and C.6. The estimates from Table 13 provide strong evidence suggesting that there is a disparity in the rate that minority motorists are stopped by State Police. This disparity could be the product of explicit or implicit police discrimination as well as changes to enforcement activity that are correlated with both race/ethnicity and daylight.

Table 13: Logistic Regression of Minority Status on Daylight, State Police Traffic Stops 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.308**	0.388**	0.165***	0.207**
	Standard Error	(0.138)	(0.158)	(0.032)	(0.101)
Sample Size		3390	3269	3210	3838
Pseudo R^2		0.026	0.030	0.035	0.030

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

As mentioned, these estimates aggregate all traffic stops across multiple departments and should be considered an average effect. Although the results from this section find a statistically significant disparity in the rate of minority traffic stops in Rhode Island, these results do not identify the geographic source of that disparity. The results of a department-level analysis are presented in a later section and better identify the source of specific department-wide disparities. However, the next section provides an additional set of robustness checks using a select sample of moving violations. As will be discussed subsequently, these robustness checks are necessary because certain types of stops (e.g. headlight, seatbelt, and cell phone violations) may be correlated with darkness and minority status. Although we find a statistically significant result across all jurisdictions, we should thus expect the previous set of results to be biased towards zero and less likely to detect discrimination.

III.B: AGGREGATE ROBUSTNESS CHECKS WITH SOLAR VISIBILITY, 2017

This section presents robustness checks on the initial specifications using a more restrictive subsample of traffic stops. Analysis using all violations is potentially biased by specific violations that are correlated with visibility and minority status. To see why this might be a problem, imagine that minority motorists are more likely to have a headlight or taillight out and that these violations are only observable to police during darkness. In that instance, comingling equipment violations with other violations might make it more likely to observe more minorities stopped at night, thus biasing the results downward. In contrast, if minority motorists are more likely to talk on their cellphone or drive without a seatbelt and those violations are more easily observed during daylight, the results would be biased upwards. Since both of these scenarios seem reasonable and the net direction of the bias is unclear, a reasonable robustness check is to limit the sample of traffic stops to moving violations.

Table 14 presents the aggregate results estimated from a sample of moving violations made during the inter-twilight window in 2017. As before, these results were estimated with the standard errors clustered by department. The estimates include controls for time of day, day of week, and department fixed-effects. The coefficient estimates are positive which indicates that the odds a stopped motorist is black increases during daylight. These estimates are statistically significant for the specifications where minority status is defined as motorists who are black, Hispanic, and black or Hispanic. Adding a high-dimensional set of officer fixed-effects, as shown in Appendix C, Table C.4, increases the precision of the estimates such that all of the specifications are highly significant. As before, we note that this disparity could be the product of explicit or implicit police discrimination as well as remaining unobserved changes to speed enforcement that are correlated with both race/ethnicity and daylight.

Table 14: Logistic Regression of Minority Status on Daylight with Department Fixed-Effects, All Moving Violations 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.078	0.145***	0.108	0.097*
	Standard Error	(0.071)	(0.050)	(0.071)	(0.050)
Sample Size		35048	32993	33158	37152
Pseudo R^2		0.148	0.150	0.195	0.172

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

Table 15 presents the aggregate results estimated from a sample of municipal moving violations made during the inter-twilight window in 2017. As before, these results were estimated with the standard errors clustered by department. The estimates include controls for time of day, day of week, and department fixed-effects. The coefficient estimates are positive which indicates that the odds a stopped motorist is black increases during daylight. These estimates are statistically significant for the specifications where minority status is defined as motorists who are Hispanic and black or Hispanic combined. Adding a high-dimensional set of officer fixed-effects, as shown in Appendix C, Table C.5, increases the precision of the estimates such that all of the specifications are highly significant. As before, we note that this disparity could be the product of explicit or implicit police discrimination as well as remaining unobserved changes to speed enforcement that are correlated with both race/ethnicity and daylight.

Table 15: Logistic Regression of Minority Status on Daylight, Municipal Moving Violations 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.043	0.112**	0.108	0.086
	Standard Error	(0.076)	(0.052)	(0.075)	(0.054)
Sample Size		32044	30550	30785	34361
Pseudo R^2		0.143	0.159	0.209	0.182

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

Table 16 presents the results from the subsample of State Police moving violations during the inter-twilight window. As before, these results were estimated with the standard errors clustered by State Police barracks. The estimates include controls for time of day, day of week, and department fixed-effects. The coefficient estimates are positive which indicates that the odds a stopped motorist is black increases during daylight. These estimates are statistically significant for the specifications only where minority status is defined as black or Hispanic. Adding a high-dimensional set of officer fixed-effects, as shown in Appendix C, Table C.6, increases the precision of the estimates such that the non-white and Hispanic specifications also become significant. As before, we note that this disparity could be the product of explicit or implicit police discrimination as well as remaining unobserved changes to speed enforcement that are correlated with both race/ethnicity and daylight.

Table 16: Logistic Regression of Minority Status on Daylight, State Police Moving Violations 2017

LHS: Minority Status		Non-White	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.360**	0.449**	0.101	0.202
	Standard Error	(0.168)	(0.186)	(0.071)	(0.146)
Sample Size		2281	2185	2111	2512
Pseudo R^2		0.023	0.030	0.034	0.028

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

The results presented in the state-level analysis provide strong evidence that a disparity exists in the rate of minority traffic stops by both municipal and State Police departments in 2017. Throughout, the disparity persists through the inclusion of both department as well as officer fixed-effects. Further, the level of significance grows across all specifications when the sample is restricted to moving violations. In the preceding section, the test will be applied to individual municipal departments and State Police barracks.

III.C: DEPARTMENT ANALYSIS WITH SOLAR VISIBILITY, 2017

The analysis presented at the state-level shows that the odds a stopped motorist is a minority increases in daylight relative to darkness. As noted in the introduction and detailed in Appendix A.2, we can directly attribute this disparity to a change in the odds that a minority motorist is stopped in daylight relative to

darkness under reasonable conditions about the counterfactual. By construction, the aggregate analysis does not investigate the source of these disparities in terms of specific municipal police departments or State Police barracks. The analysis presented in this section seeks to better identify the sources of that disparity by running the same test for individual departments and State Police barracks.

In this section, we estimate Equation 4 of Appendix A.2 separately for each municipal department and state police barracks. Thus, each set of estimates includes a vector of town-specific controls for time of day, day of week, and department fixed-effects. We identify all departments and State Police barracks found to have a disparity that is statistically significant at the 95 percent level in either of the Hispanic or black alone minority groups. The full set of results are contained in Table C.7 of Appendix C. Although we do not include officer fixed or restrict the sample to moving violations here, Appendix C, Tables C.8, C.9 and C.10 contain results with these more rigorous specifications. As discussed in detail below, we annotate those departments that do not withstand the scrutiny of the robustness checks.

Table 17 presents the results from estimating the Solar Visibility test statistic for individual departments using the 2017 sample. There were six municipal departments and two State Police barracks found to have a disparity that was statistically significant at the 95 percent level in the black or Hispanic categories and which had a false discovery rate below 10 percent. As noted, the disparity for two municipal departments and one State Police barracks in Table 17 did not persist through all of the robustness checks that included officer fixed-effects, the moving violation subsample, and the combination of these specifications. In total, the disparity persisted through these robustness checks for four municipal departments and one State Police barrack: Barrington, Cranston, Pawtucket, Tiverton, and RISP- Hope Valley. Barrington, Pawtucket, and Tiverton were observed to have a disparity for Hispanic motorists alone while RISP- Hope Valley only had a disparity for Black motorists. On the other hand, Cranston for both black and Hispanic motorists.

Table 17: Logistic Regression of Minority Status on Daylight, Select Department Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	-0.111	-0.009	1.608***	0.768***
	Standard Error	(0.326)	(0.382)	(0.433)	(0.293)
	P-Value	0.734	0.980	0.001	0.008
	Q-Value	N/A	N/A	0.001	0.068
	Effective Sample	836	785	763	836
	Pseudo R2	0.032	0.037	0.105	0.046
Cranston	Coefficient	0.284***	0.294***	0.375***	0.319***
	Standard Error	(0.074)	(0.078)	(0.075)	(0.064)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.001	0.001
	Effective Sample	5308	5045	5274	6338
	Pseudo R2	0.008	0.009	0.010	0.008
Middletown+	Coefficient	1.457***	1.381***	0.165	0.842++
	Standard Error	(0.470)	(0.497)	(0.444)	(0.382)
	P-Value	0.002	0.006	0.708	0.028
	Q-Value	0.024	0.052	0.853	0.112
	Effective Sample	690	677	630	730
	Pseudo R2	0.063	0.071	0.039	0.043

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Pawtucket	Coefficient	0.153	0.167	0.317**	0.233++
	Standard Error	(0.115)	(0.118)	(0.128)	(0.101)
	P-Value	0.180	0.153	0.013	0.021
	Q-Value	0.374	0.363	0.079	0.104
	Effective Sample	2409	2357	2220	2900
	Pseudo R2	0.023	0.025	0.012	0.017
RISP - Hope Valley	Coefficient	0.546**	0.864***	0.159	0.546**
	Standard Error	(0.224)	(0.263)	(0.291)	(0.219)
	P-Value	0.014	0.001	0.583	0.013
	Q-Value	0.085	0.014	0.814	0.079
	Effective Sample	836	775	757	875
	Pseudo R2	0.035	0.048	0.037	0.035
RISP – Lincoln+	Coefficient	0.409**	0.532***	0.158	0.263
	Standard Error	(0.174)	(0.203)	(0.202)	(0.168)
	P-Value	0.018	0.008	0.437	0.118
	Q-Value	0.096	0.068	0.666	0.314
	Effective Sample	1154	1004	987	1249
	Pseudo R2	0.026	0.032	0.028	0.021
Tiverton	Coefficient	0.007	0.035	1.590**	0.726+
	Standard Error	(0.388)	(0.456)	(0.660)	(0.379)
	P-Value	0.985	0.938	0.016	0.056
	Q-Value	0.985	0.954	0.085	0.216
	Effective Sample	897	810	899	929
	Pseudo R2	0.035	0.039	0.116	0.052
Warwick+	Coefficient	0.263+	0.391***	-0.224	0.035
	Standard Error	(0.140)	(0.150)	(0.142)	(0.112)
	P-Value	0.061	0.009	0.112	0.748
	Q-Value	0.216	0.068	N/A	0.853
	Effective Sample	2649	2600	2622	2889
	Pseudo R2	0.012	0.014	0.014	0.009

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day and day of the week.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.
Note 4: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).
+ Results are not robust across subsequent specifications.
++ Results are significant for the moving violation sample only.

As noted previously, only a select four of the six municipal departments and one of the two State Police barracks in Table 17 persisted through the additional robustness checks contained in the Appendix. For these departments and State Police barrack, we conclude that there is strong evidence that a disparity exists in the rate of minority traffic stops made during high visibility conditions. For the three departments where the disparity did not persist through the robustness checks, it is impossible to say if the more restrictive specifications invalidated the initial findings or whether the power was diminished by reducing the sample size. Thus, we annotate the results for those departments but caution against any undue interpretation about the fact that these results did not withstand more rigorous estimation.

One overarching observation is that the largest and most persistent disparities driving the results statewide are likely coming from these municipal departments. In terms of sample size alone, these six municipal departments represent between 20.7 to 22.1 percent of the overall inter-twilight sample meaning that they exert a lot of influence on the overall aggregate effect. However, it is impossible to clearly link these observed disparities to racial profiling as the differences could be driven by any combination of policing policy, heterogeneous enforcement patterns, or individual bad actors.

IV: ANALYSIS OF TRAFFIC STOPS, SYNTHETIC CONTROL

Traditional approaches that rely on population-based benchmarks to evaluate policing data must make a variety of very strong assumptions about the underlying risk-set of motorists. These approaches, despite their flaws, are intuitively appealing because they offer tangible descriptive measures of racial and ethnic disparities. This section presents the results of a synthetic control analysis that has the same intuition as traditional population-based benchmarks but remains grounded in rigorous statistical theory. A synthetic control is a unique benchmark constructed for each individual department using various stop-specific and town-level demographic characteristics as captured through inverse propensity score weighting. The synthetic control is then used to assess the effect of treatment on an outcome variable(s). In the present context, treatment is defined as a traffic stop made by a specific municipal police department and the outcome variable(s) indicates whether a motorist is a racial or ethnic minority.[12]

Put simply, departments differ in terms of their enforcement activity (i.e. timing of stops and types of violations ect.) and the underlying demographics of the population on the roadway. This analysis accounts for these differences by estimating a measure of similarity called a propensity score. Here, a propensity score is a measure of how similar a stop made outside a given department is to a stop made by the department being analyzed. These measures of similarity are used to weight stops when constructing an individual benchmark for each department. For example, if the department being analyzed has a high minority population and makes most of their stops on Friday nights at 7PM for speeding violations then stops made for speeding by departments with a similar residential population at this time and day will be given more weight when constructing the benchmark. This methodology ensures that there is an apples-to-apples comparison between the number of minorities stopped in a given town relative to their benchmark and allows for the interpretation of any remaining differences to be attributed to possible disparate treatment.

Weighting the observations by the inverse of the propensity score ensures that the distribution of observable characteristics is consistent between department of interest and the so-called "synthetic control". As long as these observed variables fully capture selection into treatment, inverse propensity score weighting allows for an unbiased estimate of the effect of treatment on the outcome of interest. In the present context, constructing a synthetic control using inverse propensity score weights allows for an assessment of whether specific departments are disproportionately stopping minority motorists. A detailed description of the mechanics underlining this methodology as well as the current application can be found in Appendix A.3. Generally speaking, the synthetic control approach follows a rich and extensive literature spanning the fields of statistics, economics, and public policy. The application of similar methodologies to policing data have recently entered the criminal justice literature through notable applications by McCaffrey et al. (2004), Ridgeway (2006), and Ridgeway and MacDonald (2009).

[12] In the proceeding methodological discussion, the details of the estimation procedure are presented as if a single treatment effect were estimated using a single outcome variable. However, the estimates were constructed for each municipal department using four different outcome variables.

IV.A: AGGREGATE ANALYSIS WITH SYNTHETIC CONTROL, 2017

Each individual municipal police department was examined independently by weighting observations with inverse propensity scores estimated using Equation 7 of Appendix A.3. The variables used to estimate the propensity scores are detailed in Table A.2 (1) of Appendix A.3. Treatment effects were estimated using Equation 8 of Appendix A.3 for individual departments and State Police barracks across four demographic subgroups relative to white non-Hispanics. As before, we identify all departments found to have a disparity that is statistically significant at the 95 percent level in either the Hispanic or black alone minority group. The full set of results for all departments can be found in Table D.1 of Appendix D. Although we do not use doubly-robust estimation here, Table D.2 of Appendix D contains results with this more rigorous modeling specification. Note that significantly more departments are identified in these estimates than those using doubly-robust estimation which indicates that in some departments, the results fail on balance. Thus, we present results here for departments identified using the less rigorous specification but only confidently identify those that withstand the more rigorous approach.

Table 18 presents the results from estimating treatment effects of individual departments relative to their requisite synthetic control using the 2017 sample. There were 11 municipal departments found to have a disparity that was statistically significant at the 95 percent level in the black or Hispanic categories and which had a false discovery rate below 10 percent. As noted, the disparities in all of these departments did not persist through the more restrictive modeling specifications with doubly-robust estimation. In total, there were seven municipal departments that withstood this more rigorous estimation procedure which accounted for innate differences in the construction of a synthetic control. In particular, the departments that persisted through our primary specification and robustness checks included: Cumberland, Foster, Johnston, Lincoln, Middletown, North Smithfield, and Portsmouth.

Table 18: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Treatment, Select Department Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Cumberland	Coefficient	-0.166+++	-0.037	0.308***	0.180***
	Standard Error	(0.046)	(0.052)	(0.045)	(0.037)
	P-Value	0.001	0.460	0.001	0.001
	Q-Value	0.001	N/A	0.001	0.001
	Effective Sample	214700	214700	214700	214700
East Providence+	Coefficient	1.261***	1.302***	0.620***	1.090***
	Standard Error	(0.054)	(0.059)	(0.063)	(0.046)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.004	0.004	0.004	0.004
	Effective Sample	186738	186738	186738	186738
Foster	Coefficient	0.638***	0.479***	0.767***	0.714***
	Standard Error	(0.089)	(0.104)	(0.112)	(0.081)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.001	0.004
	Effective Sample	63471	63471	63471	63471

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Johnston	Coefficient	6.532+++	N/A	0.488***	0.165***
	Standard Error	(0.041)	(0.045)	(0.043)	(0.035)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.004	0.001
	Effective Sample	193785	193785	193785	193785
Lincoln	Coefficient	0.342***	0.330***	1.118***	0.786***
	Standard Error	(0.068)	(0.075)	(0.064)	(0.054)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.004	0.004
	Effective Sample	214700	214700	214700	214700
Middletown	Coefficient	0.008	0.425***	N/A	0.096**
	Standard Error	(0.043)	(0.046)	(0.054)	(0.039)
	P-Value	0.862	0.001	0.001	0.013
	Q-Value	1.000	0.004	N/A	0.043
	Effective Sample	214700	214700	214700	214700
North Smithfield	Coefficient	1.179***	1.238***	1.657***	1.565***
	Standard Error	(0.104)	(0.127)	(0.135)	(0.098)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.004	0.004	0.004	0.004
	Effective Sample	199360	199360	199360	199360
Portsmouth	Coefficient	0.166***	0.310***	-0.273+++	0.101**
	Standard Error	(0.050)	(0.054)	(0.063)	(0.043)
	P-Value	0.001	0.001	0.001	0.017
	Q-Value	0.001	0.001	0.001	0.056
	Effective Sample	199360	199360	199360	199360
Tiverton+	Coefficient	3.803+++	1.067***	1.241***	0.028
	Standard Error	(0.057)	(0.064)	(0.067)	(0.070)
	P-Value	0.001	0.001	0.001	0.689
	Q-Value	N/A	0.004	0.004	1.000
	Effective Sample	138008	138008	138008	138008
Warren+	Coefficient	0.024	-0.202+++	0.216**	-0.596+++
	Standard Error	(0.064)	(0.078)	(0.090)	(0.063)
	P-Value	0.713	0.008	0.017	0.001
	Q-Value	1.000	N/A	0.056	N/A
	Effective Sample	140035	140035	140035	140035
West Warwick+	Coefficient	-0.563+++	-1.003+++	0.660***	-1.078+++
	Standard Error	(0.045)	(0.063)	(0.061)	(0.054)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.004	N/A
	Effective Sample	128620	128620	128620	128620

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.

Note 2: Propensity scores were estimated using principal components analysis of traffic stop characteristics as well as Census data selected using the Kaiser-Guttman stopping rule. Traffic stop characteristics include time of the day, day of the week, month, department traffic stop volume, officer traffic stop volume, and type of traffic stop. Census demographics for both the primary and border towns include retail employment, entertainment employment, commuting population, vacant housing, rental housing, median earnings, population density, gender, age, race, and ethnicity.

Note 3: Sample includes all traffic stops made by the primary department and an inverse propensity score weighted sample of all other departments from October 2013 to September 2017.

Note 4: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

+ Results are not robust across subsequent specifications.

As noted previously, only a select number of these persisted through the additional robustness check contained in the Table D.2 of Appendix D. Although it is impossible to determine whether these robustness checks invalidated the findings in Table 18 or whether a balanced synthetic control is simply not able to be created, we annotate the results for those departments and caution against any undue interpretation. As before, the cautionary note here is due to the fact that it is impossible to clearly link the observed disparities to racial profiling as these differences may be driven by any combination of policing policy, heterogeneous enforcement patterns, or individual bad actors.

V: ANALYSIS OF TRAFFIC STOPS, DESCRIPTIVE STATISTICS AND INTUITIVE MEASURES

The descriptive statistics and benchmarks presented in this section help to understand patterns in Rhode Island policing data. Although these simple statistics present an intriguing story, conclusions should not be drawn from any one measure alone. The two previously applied statistical tests of racial and ethnic disparities in the policing data are based solely on the policing data itself and rely on the construction of a theoretically derived identification strategy and a natural experiment. These results have been applied by academic and police researchers in numerous areas across the country and are generally considered to be the most current and relevant approaches to assessing policing data.

In all the benchmark analysis, the demography of motorists was grouped into three overlapping categories to ensure a large enough sample size for the analysis. Much of the analysis focuses on stops made of black (Hispanic or non-Hispanic) and Hispanic motorists (any race), the analysis also was conducted for aggregated groupings of all non-white motorists (Hispanic or non-Hispanic).

V.A: STATEWIDE AVERAGE COMPARISON

Comparing town data to statewide average data is frequently the first thing the public does when trying to understand and assess how a police department may be conducting traffic stops. In this section, a comparison to the statewide average is presented alongside the context necessary to understand the information. This benchmark does provide a simple and effective way to establish a baseline for all towns from which the relative differences between town stop numbers become more apparent. A detailed explanation of the methodology can be found in Appendix A.4. The analysis presented in this report only identified the departments for which the statewide average comparison indicated the largest distances between the net stop percentage and net resident population using 10 or more points as a threshold. Tables showing the calculations for all departments, rather than just those showing distance measures of more than 10 points, can be found in Appendix E of this report. Readers should note that this section focuses entirely on departments that exceeded the statewide average for stops in these racial groups.

Comparison of Black Drivers to the State Average

For the study period, the statewide percentage of motorists stopped by police who were identified as Black was 12.2 percent. Seven departments stopped a higher percentage of Black motorists than the state average, none of which exceeded the statewide average by more than 10 percentage points. The statewide average for Black residents (16+) is 4.5 percent. Of the seven towns that exceeded the statewide average for Black motorists stopped, five also have Black resident populations (16+) that exceeded the statewide average.

After the stop and resident population percentages were adjusted using the method described in Appendix A.4 (2), there were no towns found to have a relative distance between their net Black driver stop percentage and net Black population percentage of more than 10 points. Results for all departments are contained in the Table E.1 of Appendix E.

Comparison of Hispanic Motorists to the Statewide Average

For the study period, the statewide percentage of motorists stopped by police who were identified as Hispanic was 14.5 percent. Eight towns stopped a higher percentage of Hispanic motorists than the state average, only one of which exceeded the statewide average by more than 10 percentage points. The statewide Hispanic resident population (16+) is 10.5 percent. The ratio of stopped Hispanic motorists to Hispanic residents (16+) on a statewide basis was slightly higher (14.5 percent Hispanic motorists' stopped/10.5 percent Hispanic residents). Of the eight towns that exceeded the statewide average for Hispanic motorists stopped, four also have Hispanic resident populations (16+) that exceeded the statewide average.

After the stop and resident population percentages were adjusted using the method described in Appendix A.4 (2), only North Smithfield was found to have a relative distance between their net Hispanic driver stop percentage and net Hispanic population percentage of more than 10 points. Table 19 shows the data for these two towns. All department results are contained in the Table E.2 of Appendix E.

Table 19: Statewide Average Comparisons for Hispanic Motorists for Selected Towns

Municipal Department	Hispanic Stops	Difference Between Town and State Average	Hispanic Residents Age 16+	Difference Between Town and State Average	Distance Between Net Differences
North Smithfield	18.1%	3.6%	1.8%	-8.7%	12.3%

Comparison of Minority Motorists to the State Average

The final category involves all motorists classified as "Minority." This Minority category includes all racial classifications except for white motorists. Specifically it covers Blacks, Hispanics, Asian/Pacific Islander, American Indian/Alaskan Native, and Other Race classifications included in the census data.

For the study period, the statewide percentage of stopped motorists who were identified as Minority was 28.9 percent. Eight departments stopped a higher percentage of Minority motorists than the state average, three of which exceeded the state average by more than 10 percentage points. The statewide average for Minority residents (16+) is 20.4 percent. Of the eight towns that exceeded the statewide average for Minority motorists stopped, four also have Minority resident populations (16 +) that exceeded the statewide average.

After the stop resident population percentages were adjusted using the method described in Appendix A.4 (2), a total of four departments were found to have a relative distance between their net Minority driver stop percentage and net Minority driving age population percentage of more than 10 points. Table 20 shows the data for these four towns. All department results are contained in the Table E.3 of Appendix E.

Table 20: Statewide Average Comparisons for Minority Motorists for Selected Towns

Municipal Department	Minority Stops	Difference Between Town and State Average	Minority Residents Age 16+	Difference Between Town and State Average	Distance Between Net Differences
North Smithfield	33.7%	4.8%	3.5%	-16.9%	21.7%
Cranston	41.2%	12.3%	20.3%	-0.1%	12.4%
North Providence	35.1%	6.2%	14.4%	-6.0%	12.2%
Lincoln	27.7%	-1.2%	8.2%	-12.2%	11.0%

V.B: ESTIMATED COMMUTER DRIVING POPULATION COMPARISON

Adjusting "static" residential census data to approximate the estimated driving demographics in a particular jurisdiction provides a more accurate benchmark method than previous census-based approaches. At any given time, nonresidents may use any road to commute to work or travel to and from entertainment venues, retail centers, tourist destinations, etc. in a particular town. It is impossible to account for all driving in a community at any given time, particularly for the random, itinerant driving trips sometimes made for entertainment or recreational purposes. However, residential census data can be modified to create a reasonable estimate of the possible presence of many nonresidents likely to be driving in a given community because they work there and live elsewhere. This methodology is an estimate of the composition of the driving population during typical commuting hours. A detailed explanation of the methodology can be found in Appendix A.4.

The Estimated Commuter Driving Population (EDP) analysis was confined to the 37 municipal police departments[13] in Rhode Island. The only traffic stops included in this analysis were stops conducted Monday through Friday from 6:00am to 10:00am and 3:00pm to 7:00pm (peak commuting hours).

Overall, when compared to their respective EDP, 32 departments had a disparity between the Minorities stopped and the proportion of non-whites estimated to be in the EDP. For many of these departments (13) the disparity was very small (less than five percentage points). In the remaining five communities, the disparity was negative, meaning that more whites were stopped than expected in the EDP numbers. However, the negative disparities were also very small in most communities. All 37 departments had a disparity for Black motorists stopped and 31 departments with a disparity for Hispanic motorists stopped when compared to the respective EDPs.

Due to the margins of error inherent in the EDP estimates, we established a reasonable set of thresholds for determining if a department shows a disparity in its stops when compared to its EDP percentages. Departments that exceed their EDP percentages by greater than 10 percentage points in any of the three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic, were identified in our tier one group. In addition, departments that exceeded their EDP percentage by more than five but less than 10 percentage points were identified in our tier two group for this benchmark if the ratio of the percentage of stops for the target group compared to the baseline measure for that group also was 1.75 or above (percentage of stops divided by benchmark percentage equals 1.75 or more) in any of the three

[13] The New Shoreham Police Department did not report traffic stop information during this period.

categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, or (3) Hispanic. All department results are contained in the Table E.4, Table E.5, and Table E.6 of Appendix E.

Table 21: Highest Ratio of Stops to EDP (Tier I)

Department Name	Number of Stops	Stops	EDP	Absolute Difference	Ratio
Minority (All Non-White)					
Providence	4,340	64.4%	40.3%	24.1%	1.60
North Smithfield	1,066	27.4%	7.4%	20.0%	3.70
Cranston	6,863	38.9%	19.9%	19.0%	1.95
North Providence	1,881	32.7%	15.8%	16.9%	2.07
Johnston	2,710	23.7%	12.4%	11.3%	1.91
Lincoln	576	23.8%	13.1%	10.7%	1.82
Black (Non-Hispanic)					
Providence	4,340	24.7%	8.9%	15.8%	2.77
North Providence	1,881	14.9%	4.1%	10.8%	3.63
Hispanic (All Racial Groups)					
Providence	4,340	36.8%	22.9%	13.9%	1.61
Cranston	6,863	21.3%	9.4%	12.0%	2.28
North Smithfield	1,066	15.0%	3.7%	11.3%	4.09

Table 22: High Ratio of Stops to EDP (Tier II)

Department Name	Number of Stops	Stops	EDP	Absolute Difference	Ratio
Minority (All Non-White)					
Foster	271	9.6%	1.0%	8.6%	9.59
Barrington	1,242	13.0%	6.5%	6.5%	1.99
Hopkinton	653	9.2%	3.4%	5.8%	2.70
Warren	1,112	11.3%	5.6%	5.7%	2.02
Portsmouth	2,034	12.5%	6.9%	5.6%	1.81
Little Compton	289	6.2%	1.1%	5.1%	5.66
Jamestown	342	7.0%	1.9%	5.1%	3.69
Glocester	925	7.4%	2.3%	5.1%	3.20
Black (Non-Hispanic)					
Central Falls	1,470	16.5%	6.7%	9.8%	2.46
Cranston	6,863	14.0%	4.5%	9.4%	3.07
Pawtucket	5,294	18.7%	9.5%	9.2%	1.96
East Providence	3,003	14.0%	4.9%	9.1%	2.84
North Smithfield	1,066	10.0%	1.1%	9.0%	9.34
Middletown	1,104	10.6%	3.8%	6.8%	2.81
Johnston	2,710	8.7%	2.5%	6.1%	3.40
Portsmouth	2,034	7.0%	1.7%	5.4%	4.22
Newport	1,455	10.5%	5.3%	5.2%	2.00

Department Name	Number of Stops	Stops	EDP	Absolute Difference	Ratio
Warren	1,112	6.4%	1.4%	5.0%	4.67
Smithfield	1,994	7.2%	2.3%	5.0%	3.19

Hispanic (All Racial Groups)					
North Providence	1,881	17.0%	7.3%	9.7%	2.32
Lincoln	576	14.6%	6.0%	8.6%	2.42
Johnston	2,710	13.0%	6.3%	6.7%	2.07

V.C: RESIDENT ONLY STOP COMPARISON

The final population benchmark comparison limits the analysis to stops involving only residents of the community and compares them to the community demographics based on the 2010 decennial census for residents age 16 and over. While comparing resident-only stops to the resident driving age population eliminates the influence out-of-town motorists has on the roads at any given time, the mere existence of a disparity is not in and of itself significant unless it does so by a significant amount. Such disparities may exist for several reasons including high police presence in high crime areas. A detailed explanation of the methodology can be found in Appendix A.4.

The resident only stop comparison analysis was confined to the 37 municipal police departments[14] in Rhode Island where decennial census information could be derived. The only traffic stops included in this analysis were stops where the driver was reported to be a resident of the town where they were stopped. For example, a resident of Providence stopped by Providence police would be included in the Providence analysis.

Overall, when compared to the census, 35 departments stopped more Minority resident motorists than their 16+ census population. Again, the disparity for many of these departments was very small. In the remaining two communities, the disparity was negative; meaning that more whites were stopped than expected based on the population numbers. However, the negative disparities were also very small in most communities. Almost all departments (34 of 37) had a disparity for Black motorists stopped and 25 departments had a disparity for Hispanic motorists stopped when compared to the resident driving age population.

Departments with a difference of 10 percentage points or more between the resident stops and the 16+ resident population in any of the three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic, were identified in our tier one group. In addition, departments that exceeded their resident population percentage by more than five but less than 10 percentage points were identified in our tier two group for this benchmark if the ratio of the percentage of resident stops for the target group compared to the baseline measure for that group also was 1.75 or above(percentage of stopped residents divided by resident benchmark percentage equals 1.75 or more) in any of three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic. All department results are contained in the Table E.7, Table E.8, and Table E.9 of Appendix E.

[14] The New Shoreham Police Department did not report traffic stop information during this period.

Table 23: Highest Ratio of Resident Population to Resident Stops (Tier I)

Department Name	Number of Residents	Residents	Resident Stops	Minority Resident Stops	Difference	Ratio
Minority (All Non-White)						
Providence	141,375	56.9%	10,170	83.7%	26.8%	1.47
Pawtucket	56,546	38.7%	5,088	55.4%	16.6%	1.43
Woonsocket	32,338	23.3%	2,610	39.6%	16.3%	1.70
Central Falls	14,248	69.8%	1,351	81.7%	11.9%	1.17
North Providence	27,231	14.4%	1,697	25.9%	11.5%	1.80
Newport	21,066	18.1%	2,602	29.3%	11.2%	1.62
Black (Non-Hispanic)						
Providence	141,375	12.4%	10,170	33.3%	20.8%	2.68
Pawtucket	56,546	11.1%	5,088	26.8%	15.7%	2.41
East Providence	39,044	5.2%	2,222	18.0%	12.8%	3.46
Newport	21,066	6.1%	2,602	18.1%	12.0%	2.95
Hispanic (All Racial Groups)						
Providence	141,375	33.5%	10,170	47.9%	14.3%	1.43
Woonsocket	32,338	10.7%	2,610	23.3%	12.6%	2.18
Pawtucket	56,546	17.4%	5,088	28.0%	10.6%	1.61

Table 24: High Ratio of Resident Population to Resident Stops (Tier II)

Department Name	Number of Residents	Residents	Resident Stops	Minority Resident Stops	Difference	Ratio
Minority (All Non-White)						
Hopkinton	6,443	2.5%	67	11.9%	9.5%	4.87
Johnston	23,899	8.9%	1,058	17.2%	8.3%	1.93
North Smithfield	9,793	3.5%	322	11.5%	8.0%	3.32
Black (Non-Hispanic)						
North Providence	27,231	3.9%	1,697	12.7%	8.8%	3.26
Middletown	12,812	4.2%	932	12.8%	8.5%	3.01
Woonsocket	32,338	4.9%	2,610	12.3%	7.4%	2.52
Central Falls	14,248	6.8%	1,351	14.2%	7.4%	2.08
South Kingstown	25,918	2.1%	700	9.0%	6.9%	4.25
Hispanic (All Racial Groups)						
Johnston	23,899	4.6%	1,058	11.7%	7.2%	2.57
North Providence	27,231	6.5%	1,697	12.6%	6.1%	1.95
Hopkinton	6,443	1.6%	67	7.5%	5.8%	4.58
North Smithfield	9,793	1.8%	322	6.8%	5.0%	3.74

V.D: SUMMARY OF THE DESCRIPTIVE COMPARISONS

The descriptive tests outlined in the above sections are designed to be used as a screening tool to identify those jurisdictions with consistent data disparities that exceed certain thresholds. The tests compare stop data to three different benchmarks: (1) statewide average, (2) the estimated commuter driving population, and (3) resident-only stops that each cover three demographic categories: Black non-Hispanic, Hispanic, and Minority (all non-white). Department data is then measured against the resulting nine descriptive measures for evaluation purposes.

In order to weight the disparities within the descriptive benchmarks, any disparity greater than 10 percentage points for a measure was given a weight of one (1) point. Any disparity of more than 5, but less than 10 percentage points accompanied by a disparity ratio of 1.75 or above was given a weight of 0.5 points. Therefore, a department could score no more than nine (9) total points.

Table 25 identifies the three departments with significant disparities. A department was identified if the stop data was found to exceed the disparity threshold level in at least two of the three-benchmark areas and a weighted total score of 4.5 or more. All department results are contained in the Table E.10 of Appendix E.

Table 25: Departments with the Greatest Number of Disparities Relative to Descriptive Benchmarks

Department Name	Statewide Average			Estimated Driving Population			Resident Population			Point Total
	M	B	H	M	B	H	M	B	H	
Providence				24.1	15.8	13.9	26.8	20.8	14.3	6
North Smithfield	21.7		12.3	20.0	9.0	11.3	8.0		5.0	5.5
North Providence	12.2			16.9	10.8	9.7	11.5	8.8	6.1	5.5

Note 1: M=Minority, B=Black, H=Hispanic (Numbers of 10 or above yield one point, numbers less than 10 equal 0.5 points)

VI. ANALYSIS OF STOP DISPOSITION, EQUALITY OF DISPOSITIONS

In this section, we test for disparities in the outcomes of traffic stops using a model that examines the distribution of outcomes conditional on race and the reason for the stop. Following the model outlined in Equation 9 of Appendix A.5, we test whether traffic stops made of minority motorists result in different outcomes relative to their white non-Hispanic peers. It is unclear whether we should expect police discrimination to result in more or less citations relative to warnings and searches. If we discovered that minority motorists receive more citations conditional on the reason that they are stopped, we might interpret this as evidence adverse treatment. On the other hand, we could draw the same conclusion if minorities receive less citations and more warnings since these might represent pretextual stops. Thus, we proceed by simply testing for equality in the distribution of outcomes across different demographic groups conditional on the motivating reason for the stop. The intuition is similar to hit-rate style tests but where we are unable to predict the direction that we expect bias to take. We implement the test by applying a multinomial logistic regression on the six possible stop outcomes and condition on race and the reason for the stop. We then conduct a joint hypothesis test on the interaction between an indicator of race and the reason for the stop.

We account for differences in outcomes not related to this interaction term by including additional controls for age, gender, time of day, day of week, week of year, and officer fixed-effects. Unlike previous sections where our main specification omits officer fixed-effects, here we only estimate models that include this key set of granular control. The reason behind this key difference is because, in the case of stop disposition, it seems very likely that officer heterogeneity (in terms of geography and assignment) might have a large impact on the relationship between race, basis for a stop, and the subsequent outcome. We provide one important cautionary note about interpreting our test as causal evidence of discrimination. Ideally, this test would be performed on data containing *all* violations observed by the police officer prior to making a traffic stop and where we would include a control for the number of total violations. In practice, data on traffic stops typically only contain the most severe reason that motivated the stop. In the absence of data on the full set of violations observed by police officers, we suggest that the reader interpret results from this test as providing descriptive evidence to be viewed in concert with other such empirical measures.

VI.A: AGGREGATE ANALYSIS OF STOP DISPOSITION, 2017

Table 26 presents the results of applying a multinomial logit to a sample of all traffic stops with six distinct stop outcomes regressed on race, stop basis, and their interaction. We present only the coefficient estimates on the interaction between race and the stop basis for each outcome relative to the omitted category, i.e. no search- ticket or misdemeanor issued. Across all specifications, we find strong evidence suggesting that minority motorists are treated differently than their White Non-Hispanic counterparts even when they are stopped for the same reason. Interestingly, minority drivers are more frequently given a warning regardless of whether they are searched. The disparity is largest in magnitude for stops made on the basis of a license or registration problem as well as suspicious circumstances. A joint hypothesis test across all the interaction terms and all outcomes indicates that the difference in outcomes are

statistically significant at the 99 percent level for each demographic group relative to White Non-Hispanic motorists.

Table 26: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop, All Traffic Stops 2017

	Non-White		Black		Hispanic		Black or Hispanic	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
No Search, Warning or No Action								
Other	0.184**	0.087	0.168**	0.083	0.283**	0.126	0.212**	0.1
Equip.	0.239*	0.123	0.19	0.13	0.287**	0.139	0.232*	0.131
SB or Cell	0.304**	0.148	0.274*	0.148	0.266**	0.126	0.27**	0.123
Reg. or Lic.	0.46***	0.164	0.441***	0.165	0.583**	0.235	0.493**	0.197
Suspicion	0.221	0.176	0.225	0.179	0.215	0.165	0.168	0.165
No Search, Arrest								
Other	-0.29**	0.122	-0.367***	0.117	-0.307	0.217	-0.334***	0.107
Equip.	0.034	0.191	-0.101	0.195	-0.293	0.235	-0.167	0.185
SB or Cell	0.045	0.243	-0.054	0.252	-0.285*	0.165	-0.14	0.219
Reg. or Lic.	-0.102	0.154	-0.228	0.169	-0.676***	0.161	-0.243*	0.144
Suspicion	-0.513***	0.144	-0.633***	0.144	-0.184*	0.096	-0.643***	0.13
Search, Ticket or Misdemeanor								
Other	0.165	0.123	0.171	0.121	0.056	0.131	-0.008	0.098
Equip.	0.315**	0.156	0.312**	0.157	-0.069	0.137	0.169	0.135
SB or Cell	0.279*	0.147	0.24*	0.14	0.116	0.215	0.05	0.123
Reg. or Lic.	0.154	0.194	0.191	0.203	-0.069	0.173	0.154	0.181
Suspicion	0.147	0.294	0.218	0.29	0.213	0.136	0.042	0.197
Search, Warning or No Action								
Other	0.206*	0.123	0.169	0.14	0.235*	0.129	0.155	0.129
Equip.	0.122	0.141	0.041	0.152	0.154	0.166	0.113	0.131
SB or Cell	0.257	0.178	0.204	0.208	0.652**	0.271	0.14	0.139
Reg. or Lic.	0.868***	0.248	0.754***	0.289	0.403**	0.183	0.716**	0.284
Suspicion	0.6***	0.151	0.549***	0.156	-0.507	0.332	0.402***	0.153
Search, Arrest								
Other	-0.481	0.337	-0.578*	0.335	-0.311	0.26	-0.649**	0.28
Equip.	0.022	0.46	-0.114	0.471	-0.829***	0.29	-0.246	0.323
SB or Cell	-0.346	0.397	-0.539	0.407	-0.01	0.326	-0.615*	0.326
Reg. or Lic.	0.048	0.321	-0.112	0.349	-1.123***	0.303	-0.091	0.297
Suspicion	-1.045***	0.376	-1.183***	0.371	0***	0	-1.097***	0.3
Chi^2	440.86		444.83		682.73		446.7	
P-Value	0.000		0.000		0.000		0.000	
Sample Size	220,658		215,261		213,580		244,077	

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.

Note 2: All specifications include controls for gender, age, time of the day, day of the week, week of year, and officer fixed-effects.
Note 3: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

Table 27 presents the results of applying a multinomial logit to a subset of traffic stops made by municipal police departments. As before, we test for differences across six distinct stop outcomes for motorists of different races but who were stopped for the same reason. Across all specifications, we again find strong evidence suggesting that minority motorists are treated differently than their White Non-Hispanic counterparts even when they are stopped for the same reason. For the sample of municipal stops, we find that minority motorists are more frequently let off with a warning regardless of whether they are searched. Black drivers, in particular, are much more likely to be let off with only a ticket in the case that they are searched. As with the overall sample, stops for suspicious activity as well as those made for license or registration problems have the largest and most consistent disparity across all specifications. Again, a joint hypothesis test across all the interaction terms and all outcomes indicates that the difference in outcomes are statistically significant at the 99 percent level for each demographic group relative to White Non-Hispanic motorists.

Table 27: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop, Municipal Traffic Stops 2017

	Non-White		Black		Hispanic		Black or Hispanic	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
No Search, Warning or No Action								
Other	0.18**	0.091	0.178**	0.088	0.307**	0.155	0.237**	0.118
Equip.	0.308**	0.145	0.269*	0.155	0.387**	0.177	0.328**	0.161
SB or Cell	0.094	0.172	0.072	0.175	0.156	0.144	0.122	0.13
Reg. or Lic.	0.62***	0.186	0.604***	0.183	0.852***	0.276	0.705***	0.228
Suspicion	0.378**	0.178	0.384**	0.182	0.381**	0.183	0.339*	0.174
No Search, Arrest								
Other	-0.271**	0.125	-0.358***	0.118	-0.364**	0.176	-0.331***	0.118
Equip.	0.131	0.211	-0.023	0.216	-0.192	0.254	-0.073	0.206
SB or Cell	-0.299	0.298	-0.424	0.324	-0.427*	0.228	-0.422*	0.229
Reg. or Lic.	0.057	0.157	-0.081	0.171	-0.19	0.189	-0.138	0.147
Suspicion	-0.407***	0.141	-0.549***	0.143	-0.54***	0.159	-0.554***	0.132
Search, Ticket or Misdemeanor								
Other	0.3**	0.12	0.316***	0.114	-0.139	0.112	0.1	0.103
Equip.	0.503***	0.176	0.508***	0.171	0.169	0.167	0.333**	0.152
SB or Cell	0.335*	0.183	0.325*	0.186	-0.041	0.147	0.125	0.139
Reg. or Lic.	0.445***	0.149	0.468***	0.163	0.412*	0.217	0.415**	0.172
Suspicion	0.383	0.322	0.455	0.31	0.123	0.158	0.231	0.206
Search, Warning or No Action								
Other	0.167	0.11	0.129	0.13	0.233	0.148	0.152	0.134
Equip.	0.177	0.154	0.09	0.168	0.344**	0.155	0.192	0.153
SB or Cell	0.145	0.255	0.111	0.279	0.145	0.205	0.095	0.165
Reg. or Lic.	1.096***	0.242	0.986***	0.285	0.887***	0.316	0.963***	0.298

	Non-White		Black		Hispanic		Black or Hispanic	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Suspicion	0.68***	0.156	0.616***	0.164	0.541***	0.186	0.514***	0.162
Search, Arrest								
Other	-0.504	0.386	-0.598	0.37	-0.569	0.387	-0.688**	0.308
Equip.	0.105	0.539	-0.068	0.546	-0.289	0.289	-0.209	0.365
SB or Cell	-0.653	0.421	-0.969**	0.381	-0.914**	0.376	-0.93***	0.349
Reg. or Lic.	0.15	0.365	-0.054	0.382	0.226	0.323	0.023	0.332
Suspicion	-0.926**	0.402	-1.109***	0.399	-1.106***	0.334	-1.058***	0.322
Chi^2	364.98		367.19		344.03		384.14	
P-Value	0.000		0.000		0.000		0.000	
Sample Size	187,377		183,158		182,482		206,120	

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for gender, age, time of the day, day of the week, week of year, and officer fixed-effects.
Note 3: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

Table 28 presents the results of applying a multinomial logit to a subset of traffic stops made by State Police departments. Again, our goal is to test for differences across six distinct stop outcomes for motorists of different races but who were stopped for the same reason. Across all specifications, we again little evidence suggesting that minority motorists are treated differently than their White Non-Hispanic counterparts. For the sample of State Police stops, we do find statistically significant differences in the way that minority motorists are stopped for suspicious activity. However, we do not find any consistent differences across all other reasons for a stop. A joint hypothesis test across all the interaction terms and all outcomes indicates that the difference in outcomes are only statistically significant at the 95 percent level for the combined Black and Hispanic group relative to White Non-Hispanic motorists.

Table 28: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop, State Police Traffic Stops 2017

	Non-White		Black		Hispanic		Black or Hispanic	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
No Search, Warning or No Action								
Other	0.012	0.125	-0.061	0.125	0.021	0.07	-0.046	0.092
Equip.	-0.022	0.151	-0.108	0.161	-0.061	0.145	-0.113	0.145
SB or Cell	0.181	0.136	0.118	0.137	0.036	0.111	0.06	0.123
Reg. or Lic.	-0.033	0.184	-0.062	0.182	-0.214	0.162	-0.148	0.145
Suspicion	-0.628***	0.097	-0.646***	0.129	-0.645***	0.088	-0.72***	0.09
No Search, Arrest								
Other	-0.37	0.285	-0.396	0.272	-0.487***	0.155	-0.38***	0.113
Equip.	-0.207	0.248	-0.237	0.238	-0.598**	0.233	-0.367	0.229
SB or Cell	0.107	0.284	0.091	0.248	-0.327	0.275	0.004	0.224
Reg. or Lic.	-0.548***	0.206	-0.606***	0.185	-0.503***	0.157	-0.477**	0.201
Suspicion	-0.912***	0.229	-0.957***	0.188	-1.493***	0.23	-1.037***	0.067

	Non-White		Black		Hispanic		Black or Hispanic	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Search, Ticket or Misdemeanor								
Other	-0.133	0.259	-0.209	0.195	-0.115	0.102	-0.235**	0.091
Equip.	-0.026	0.184	-0.08	0.223	-0.016	0.156	-0.11	0.138
SB or Cell	0.226	0.303	0.174	0.271	-0.065	0.27	-0.032	0.254
Reg. or Lic.	-0.39	0.45	-0.32	0.469	-0.422	0.322	-0.334	0.299
Suspicion	-0.75**	0.351	-0.806**	0.406	-0.782**	0.363	-0.648***	0.226
Search, Warning or No Action								
Other	0.267	0.661	0.288	0.759	-0.174	0.61	0.035	0.624
Equip.	0.064	0.458	0.047	0.551	-0.223	0.27	-0.089	0.332
SB or Cell	0.363	0.238	0.298	0.325	-0.154	0.267	0.011	0.261
Reg. or Lic.	-0.346	0.561	-0.514	0.668	-0.24	0.424	-0.492	0.479
Suspicion	0.068	0.321	0.104	0.409	-0.641	0.732	-0.408	0.32
Search, Arrest								
Other	-0.157	0.763	-0.372	0.97	-0.035	0.606	-0.334	0.796
Equip.	0.132	0.593	0.334	0.743	0.278	0.437	0.274	0.788
SB or Cell	1.107*	0.667	1.312*	0.719	-0.075	0.681	1.017	0.729
Reg. or Lic.	0.672	0.641	0.847	0.676	-1.086	0.85	0.419	0.684
Suspicion	-1.547	2.065	-1.284	2.058	-0.696	1.253	-0.519	1.228
Chi^2	1.4		2.82		1.7		7.5**	
P-Value	0.798		0.589		0.686		0.025	
Sample Size	32,214		31,090		30,119		36,857	

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for gender, age, time of the day, day of the week, week of year, and officer fixed-effects.
Note 3: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

The previous set of estimates aggregate all traffic stops across multiple departments and should be considered an average effect. Although the results from this section find a statistically significant disparity in the rate of minority traffic stops made by municipal police departments in Rhode Island, these results do not identify the geographic source of that disparity. The results of a department-level analysis are presented in the next section and better identify the source of specific department-wide disparities.

VI.B: DEPARTMENT ANALYSIS OF STOP DISPOSITION, 2017

The analysis presented at the state-level shows that minority motorists are treated differently, in terms of disposition, relative to their white non-Hispanic counterparts, even when they are stopped for the same reason. By construction, the aggregate analysis does not investigate the source of these disparities in terms of specific municipal police departments or State Police barracks. The analysis presented in this section seeks to better identify the sources of that disparity by running the same test for individual municipal departments and State Police barracks. In this section, we estimate Equation 9 of Appendix A.5 separately for each municipal department and State Police barracks. Thus, each set of estimates includes

a vector of town-specific controls for time of day, day of week, and department fixed-effects. We identify all departments and State Police barracks found to have a disparity that is statistically significant at the 95 percent level in either of the Hispanic or Black alone minority groups. The full set of results are contained in Table F.1 of Appendix F.

Table 29 presents the results from estimating the test of equality in stop dispositions for minority motorists relative to their white non-Hispanic peers. As before, our test statistic is generated from a joint hypothesis test on the interaction between race and the basis for a traffic stop across all possible outcomes. For parsimony, we omit the coefficient estimates on these interaction terms and present only the chi-squared and level of significance for the joint hypothesis test. As shown below, we find that 18 of the total 44 municipal departments and State Police barracks tested had a statistically significant difference disparity in the distribution of stop outcomes for minority motorists. These results are consistent with our aggregate analysis, which indicated that the State Police did not have statistically significant difference in the distribution of outcomes. Although it does appear that minority motorists are treated differently in many of the same departments identified in other tests, we still caution the reader from drawing any conclusions based on these results. As noted before, our ideal analysis would include data on every reason that a stop was made and all requisite outcomes.

Table 29: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Barrington	Chi^2	187.367***	180.139***	1.000	1.000
	P-Value	0.000	0.000	1.000	1.000
	Q-Value	0.001	0.001	N/A	N/A
	Pseudo R2	0.328	0.331	0.331	0.324
	Sample Size	4600	4484	4451	4775
Burrillville	Chi^2	358.886	209.061***	209.988***	1.000
	P-Value	N/A	0.000	0.000	1.000
	Q-Value	N/A	0.001	0.001	N/A
	Pseudo R2	0.272	0.272	0.273	0.273
	Sample Size	4164	4144	4141	4271
Central Falls	Chi^2	1.000	112.081***	87.866***	54.589***
	P-Value	1.000	0.000	0.000	0.001
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.367	0.361	0.317	0.296
	Sample Size	2296	2273	3251	3938
Coventry	Chi^2	482.696	2843.909	214.539***	532.62
	P-Value	N/A	N/A	0.000	N/A
	Q-Value	N/A	N/A	0.001	N/A
	Pseudo R2	0.226	0.226	0.224	0.224
	Sample Size	7018	6964	6925	7130

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Cranston	Chi^2	30.847	36.338*	35.779*	40.692**
	P-Value	0.194	0.067	0.075	0.025
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.275	0.275	0.268	0.273
	Sample Size	22099	21023	21969	25870
East Providence	Chi^2	31.003	28.513	142.654***	34.884*
	P-Value	0.188	0.284	0.000	0.09
	Q-Value	N/A	N/A	0.001	N/A
	Pseudo R2	0.358	0.361	0.37	0.347
	Sample Size	9265	9115	8161	9940
Jamestown	Chi^2	1.000	177.772***	444.587	1.000
	P-Value	1.000	0.000	N/A	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.331	0.337	0.335	0.34
	Sample Size	1339	1302	1297	1361
Johnston	Chi^2	354.752	178.820***	58.693***	90.055***
	P-Value	N/A	0.000	0.000	0.000
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.301	0.308	0.289	0.289
	Sample Size	4609	4513	4733	5206
Lincoln	Chi^2	210.121***	183.992***	331.089	206.386***
	P-Value	0.000	0.000	N/A	0.000
	Q-Value	0.001	0.001	N/A	0.001
	Pseudo R2	0.317	0.319	0.307	0.3
	Sample Size	1671	1619	1730	1897
Narragansett	Chi^2	207.283***	179.233***	118.689***	723.89
	P-Value	0.000	0.000	0.000	N/A
	Q-Value	0.001	0.001	0.001	N/A
	Pseudo R2	0.236	0.236	0.234	0.231
	Sample Size	5221	5138	5063	5373
Newport	Chi^2	208.490***	96.557***	123.505***	121.578***
	P-Value	0.000	0.000	0.000	0.000
	Q-Value	0.001	0.001	0.001	0.001
	Pseudo R2	0.331	0.328	0.331	0.314
	Sample Size	6060	5970	5640	6427
North Smithfield	Chi^2	1.000	1.000	170.126***	65.175***
	P-Value	1.000	1.000	0.000	0.000
	Q-Value	N/A	N/A	0.001	0.001
	Pseudo R2	0.307	0.308	0.3	0.28
	Sample Size	3010	2916	2992	3451

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Pawtucket	Chi^2	106.166***	89.803***	119.127***	64.276***
	P-Value	0.000	0.000	0.000	0.000
	Q-Value	0.001	0.001	0.001	0.001
	Pseudo R2	0.363	0.319	0.358	0.356
	Sample Size	11607	11444	11113	13975
Scituate	Chi^2	236.438***	197.983***	1.000	1.000
	P-Value	0.000	0.000	1.000	1.000
	Q-Value	0.001	0.001	N/A	N/A
	Pseudo R2	0.21	0.208	0.217	0.212
	Sample Size	2719	2685	2687	2774
Smithfield	Chi^2	548.726	209.819***	1.000	1.000
	P-Value	N/A	0.000	1.000	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.196	0.201	0.209	0.197
	Sample Size	4957	4868	4791	5175
Warren	Chi^2	362.019	238.393***	772.565	1.000
	P-Value	N/A	0.000	N/A	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.268	0.266	0.28	0.268
	Sample Size	2667	2643	2572	2750
West Greenwich	Chi^2	100.713***	71.544***	46.717***	1.000
	P-Value	0.000	0.000	0.000	1.000
	Q-Value	0.001	0.001	0.001	N/A
	Pseudo R2	0.545	0.55	0.56	0.578
	Sample Size	881	872	866	886
Woonsocket	Chi^2	640.129	172.391***	140.902***	110.794***
	P-Value	N/A	0.000	0.000	0.000
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.298	0.3	0.3	0.279
	Sample Size	4396	4215	4501	5096

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for gender, age, time of the day, day of the week, week of year, and officer fixed-effects.
Note 3: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

VII. ANALYSIS OF VEHICULAR SEARCHES, KPT HIT-RATE

This section contains the results of an analysis of post-stop outcomes using a hit-rate approach following Knowles, Persico and Todd (2001). The hit-rate approach relies on the idea that motorists rationally adjust their propensity to carry contraband in response to their likelihood of being searched by police. Similarly, police officers rationally decide whether to search a motorist based on visible indicators of guilt and an expectation of the likelihood that a given motorist might have contraband. According to the model, a demographic group of motorists would be searched by police more often than whites if they were more likely to carry contraband. However, the higher level of searches should be exactly proportional to the higher propensity for this group to carry contraband. Thus, in the absence of racial animus, we should expect the rate of successful searches (i.e. the hit-rate) to be equal across different demographic groups regardless of differences in their propensity to carry contraband. [15] In this test, discrimination is interpreted as a preference for searching minority motorists that shows up in the data as a statistically lower hit-rate relative to white motorists. In more technical terms, the testable implication derived from this model is that the equilibrium search strategy, in the absence of group bias, will result in an equalization of the rate of contraband that is found relative to the total number of searches (i.e. the hit-rate) across motorist groups.

In our application, we test for the presence of a disparity in the rate of successful searches using a nonparametric test, the Pearson X^2 test. Note that this test inherently says nothing about disparate treatment in the decision to stop motorists as it is limited in scope to vehicular searches. We limit our analysis to discretionary searches which are defined as those characterized as probable cause, terry frisk, frisk, odor of drugs/alcohol, reasonable suspicion, consent, and unknown. Searches excluded from the discretionary category include plain view contraband, incident to arrest, and inventory/tow. We also aggregate all search data (driver, passenger, and vehicle) into a singular aggregate statistic for whether a traffic stop resulted in a search and whether contraband was found. Since we have combined data on driver and passenger searches, we must also amend the race variable to represent whether there was any minority person in the vehicle at the time of the search. For example, unlike in other sections where the Hispanic category represents the demography of the driver, here it represents whether any individual in the vehicle was observed to be Hispanic.

VII.A: AGGEGATE ANALYSIS WITH HIT-RATES, 2017

The analysis begins by aggregating all search data for Rhode Island by demography and performing the non-parametric test of hit-rates. The rate that discretionary searches end in contraband being found for white non-Hispanic motorists is compared to each minority subgroup. The results of this test, applied to the aggregate search data for all departments in Rhode Island, can be seen in Table 30. As seen below, the rate of successful searches for white non-Hispanic motorists was 29.9 percent in 2017. Relative to white non-Hispanic motorists, the hit-rate for each of the four minority subgroups was lower and ranged from 14.5 to 16.1 percent. The difference in hit-rates for each group was statistically significant at the 99

[15] Although some criticism has risen concerning the technique and extensions have suggested that more disaggregated groupings of searches be used in the test, the ability to implement such improvements is limited by the small overall sample of searches in a single year of traffic stops. Despite these limitations, the hit-rate analysis is still widely applied in practice and contributes to the overall understanding of post-stop police behavior in Rhode Island.

percent level. In aggregate, Rhode Island police departments are less successful in motorist searches across all minority groups, which is a potential indicator of disparate treatment.

Table 30: Chi-Square Test of Hit-Rate, All Discretionary Searches 2017

Variable	White	Non-White	Black	Hispanic	Black or Hispanic
Hit Rate	29.993%	16.097%***	14.470%***	15.456%***	15.428%***
Contraband	994	273	223	200	386
Searches	3314	1696	1541	1294	2502
Chi2	N/A	114.678	134.938	102.457	167.145
P-Value	N/A	0.001	0.001	0.001	0.001

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: Sample includes all discretionary searches in 2017.

Table 31 provides the results of a hit-rate analysis for discretionary searches made in aggregate by municipal departments in 2017. The hit-rate in municipal departments for white non-Hispanic motorists was 29 percent. Relative to white non-Hispanic motorists, the hit-rate for each of the four minority subgroups was lower and ranged from 12.2 to 14.1 percent. Each of these differences were also statistically significant at the 99 percent level.

Table 31: Chi-Square Test of Hit-Rate, Municipal Police Discretionary Searches 2017

Variable	White	Non-White	Black	Hispanic	Black or Hispanic
Hit Rate	29.020%	14.135%***	12.168%***	13.736%***	13.463%***
Contraband	850	216	170	157	302
Searches	2929	1528	1397	1143	2243
Chi2	N/A	122.248	149.059	103.182	177.552
P-Value	N/A	0.001	0.001	0.001	0.001

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance
Note 2: Sample includes all discretionary searches made by municipal departments in 2017.

Table 32 provides the results of a hit-rate analysis for discretionary searches made in aggregate by State Police Barracks in 2017. The aggregate hit-rate for all State Police was 38.6 percent for white non-Hispanic motorist. Relative to white non-Hispanic motorists, the hit-rate for each of the four minority subgroups was lower and ranged from 29.1 to 38.7 percent. The hit-rate for minority groups were smaller than that of White non-Hispanics but this difference was statistically indistinguishable from zero, which may be the result of a relatively small overall sample size. However, the difference in hit-rates for Hispanic motorists was significantly smaller than that of non-Hispanic white motorists.

Table 32: Chi-Square Test of Hit-Rate, State Police Discretionary Searches 2017

Variable	White	Non-White	Black	Hispanic	Black or Hispanic
Hit Rate	38.630%	35.484%	38.686%	29.054%**	33.599%
Contraband	141	55	53	43	84
Searches	365	155	137	148	250
Chi2	N/A	0.458	0.001	4.197	1.618
P-Value	N/A	0.497	0.990	0.039	0.202

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance
Note 2: Sample includes all discretionary searches made by State Police in 2017.

VII.B: DEPARTMENT ANALYSIS WITH HIT-RATES, 2017

In this subsection, differences in hit-rates are estimated independently for each municipal department and State Police barrack. Here, we identify and present only those departments found to have a disparity that is statistically significant at the 95 percent level in either the Hispanic or black alone minority groupings. The full set of results can be found in Table G.1 of Appendix G. Table 33 presents the results from estimating the hit-rate test for individual departments using the 2017 sample. There were five municipal departments found to have a disparity in the hit-rate of black motorists while four of the five also had a disparity in the hit rate for Hispanic motorists relative to white non-Hispanic motorists. The disparity in each of these departments was statistically significant at the 95 percent level, had a false discovery rate less than 10 percent, and a sample size of greater than 30 in each of these categories.

Table 33: Chi-Square Test of Hit-Rate, Select Department Discretionary Searches 2017

Department	Variable	White	Non-White	Black	Hispanic	Black or Hispanic
Cranston	Hit Rate	27.016%	19.125%%+	17.177%**	16.778%**	18.148%**
	Contraband	67	35	28	25	49
	Searches	248	183	163	149	270
	Chi2	N/A	3.628	5.356	5.479	5.848
	P-Value	N/A	0.057	0.020	0.018	0.016
	Q-Value	N/A	0.123	0.046	0.046	0.041
East Providence	Hit Rate	12.602%	4.579%**	3.200%***	1.235%***	2.703%***
	Contraband	31	6	4	1	5
	Searches	246	131	125	81	185
	Chi2	N/A	6.214	8.574	8.918	13.515
	P-Value	N/A	0.013	0.003	0.003	0.001
	Q-Value	N/A	0.037	0.016	0.016	0.001
North Providence	Hit Rate	37.255%	12.121%**	12.121%**	N/A	16.070%**
	Contraband	19	4	4	N/A	9
	Searches	51	33	33	N/A	56
	Chi2	N/A	6.364	6.364	N/A	6.198
	P-Value	N/A	0.012	0.012	N/A	0.013
	Q-Value	N/A	0.037	0.037	N/A	0.037
Pawtucket	Hit Rate	41.221%	16.841%***	14.942%***	40.323%	27.006%**
	Contraband	54	16	13	25	37
	Searches	131	95	87	62	137
	Chi2	N/A	15.307	16.958	0.014	6.032
	P-Value	N/A	0.001	0.001	0.906	0.014
	Q-Value	N/A	0.001	0.001	0.906	0.039
Providence	Hit Rate	13.734%	6.415%***	6.502%***	7.230%***	7.031%***
	Contraband	32	46	45	41	76
	Searches	233	717	692	567	1081
	Chi2	N/A	12.496	11.942	8.420	11.418
	P-Value	N/A	0.001	0.001	0.004	0.001
	Q-Value	N/A	0.001	0.001	0.016	0.001

Note 1: The coefficients are presented along with robust standard errors. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance
Note 2: Sample includes all discretionary searches made by municipal departments and State Police in 2017.
Note 3: The test was only estimated when the combined sample of white and minority motorists exceeded 30 searches.
Note 4: Q-Values were estimated using a false discovery rate procedure following Simes (1986) and later refined by Benjamini and Hochberg (1995) as well as Benjamini and Yekutieli (2001).

VIII: FINDINGS FROM THE 2017 ANALYSIS

This section represents a summary of the findings from the analysis of traffic stops conducted between January 1, 2017 and December 31, 2017.

VIII.A: AGGREGATE FINDINGS FOR RHODE ISLAND, 2017

Across Rhode Island's municipal departments and state police barracks, 12 percent of motorists stopped during the analysis period were observed to be Black while 14.3 percent of stops were Hispanic motorists. The results from the Solar Visibility analysis indicate that stopped motorists were more likely to be minorities during daylight relative to darkness suggesting the existing of a racial or ethnic disparity in terms of the treatment of minority motorists relative to Whites. The statewide results from the Solar Visibility analysis were found to be robust to the addition of a variety of controls. The level of statistical significance remained relatively consistent when the sample is reduced to only moving violations. The results from the post-stop analysis confirm that the statewide disparity carries through to post-stop behavior across all racial and ethnic groups. In aggregate, Rhode Island police departments exhibit a tendency to be less successful in motorist searches across all minority groups.

VIII.B: SOLAR VISIBILITY ANALYSIS FINDINGS, 2017

The solar visibility test identified discrimination by examining changes to the odds that a stopped motorist was a minority just before and after sunset. In particular, the test relied on a quasi-experimental design, which only examined stops occurring within a fixed window of time when the timing of sunset varied throughout the year. The empirical model also controlled for factors like the day of the week and time of the day when each stop occurred. As long as police are marginally better able to detect motorist race/ethnicity in daylight and a set of additional identifying assumptions hold, the solar visibility test will identify potential discrimination from these quasi-random changes to visibility. As described in the full report, we estimate that black motorists are more likely to be stopped during daylight relative to darkness across Rhode Island. Hispanic motorists are also more likely to be stopped in daylight by State Police.

In an effort to better identify the source of these racial and ethnic disparities, the analysis was repeated at the department level. Although there is evidence of a disparity at the state level, it is important to note that it is likely that specific departments are driving these statewide trends. The threshold for identifying individual departments was the presence of a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories and have a false discovery rate of less than 10 percent. [16] The departments that were identified as having a statistically significant disparity are the largest contributors to the overall statewide results. Here, the unit of analysis is a municipal department or State

[16] Put simply, there must have been at least a 95 percent chance that the motorists were more likely to be stopped at a higher rate relative to white Non-Hispanic motorists. The false discovery rate of 10 percent allows there to be a less than 10 percent chance that one of our identified estimates misidentifies a department.

Police barracks where disparities could be a function of a number of factors including institutional culture, departmental policy, or individual officers.[17]

The four municipal departments and one State Police barrack identified to exhibit a statistically significant racial or ethnic disparity include:

Barrington

Within the inter-twilight window, the Barrington municipal police department made 887 total stops of which 13.4 percent were made of minorities. Of the total stops, 6.3 percent were made of Hispanic motorists while 5.0 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1 while the odds that a stopped motorist was Hispanic increased by 5 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

Cranston

Within the inter-twilight window, the Cranston municipal police department made 6,601 total stops of which 45.5 percent were made of minorities. Of the total stops, 25.4 percent were made of Hispanic motorists while 21.9 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1.3 while the odds that a stopped motorist was Hispanic increased by 1.5 during daylight. Both of these results were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

Pawtucket

Within the inter-twilight window, the Pawtucket municipal police department made 2,952 total stops of which 48.8 percent were made of minorities. Of the total stops, 24 percent were made of Hispanic motorists while 28.6 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 2.4 while the odds that a stopped motorist was Hispanic increased by 1.2 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

[17] Since department or state police barrack estimates represent an average effect of stops made by individual officers weighted by the number of stops that they made in 2017, it is possible that officer-level disparities exist in departments which were not identified.

Tiverton

Within the inter-twilight window, the Tiverton municipal police department made 970 total stops of which 7.8 percent were made of minorities. Of the total stops, 3.8 percent were made of Hispanic motorists while 3.3 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 1 while the odds that a stopped motorist was Hispanic increased by 4.9 during daylight. Only the results for Hispanic motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

RISP- Hope Valley

Within the inter-twilight window, the RISP- Hope Valley State Police barracks municipal police department made 936 total stops of which 32.6 percent were made of minorities. Of the total stops, 13.5 percent were made of Hispanic motorists while 15.4 percent were Black motorists in 2017. The Solar Visibility analysis indicated a statistically significant disparity in the rate that both Black and Hispanic motorists were stopped during daylight relative to darkness. Within the inter-twilight window, the odds that a stopped motorist was Black increased by 2.4 while the odds that a stopped motorist was Hispanic increased by 1.2 during daylight. Only the results for Black motorists were statistically significant at a level greater than 95 percent, fell within the false discovery rate threshold of 10 percent, and robust to the inclusion of a variety of controls, officer fixed-effects, and a restricted sample of moving violations.

VIII.C: OTHER STATISTICAL AND DESCRIPTIVE MEASURE FINDINGS, 2017

In addition to the four municipal police departments and one state police barrack identified to exhibit statistically significant racial or ethnic disparities in the Solar Visibility analysis, 18 other departments were identified using either the synthetic control method, descriptive tests, stop disposition test or KPT hit-rate analysis. Identification in any one of these tests alone is not, in and of itself, sufficient to be identified for further analysis. However, these additional tests are designed as an additional screening tool to identify the jurisdictions where consistent disparities exceed certain thresholds that appear in the data. Although it is understood that certain assumptions have been made in the design of each of these measures, it is reasonable to believe that departments with consistent data disparities that separate them from the majority of other departments should be subject to further review and analysis with respect to the factors that may be causing these differences.

VIII.C. (1): Synthetic Control Analysis:

The results from estimating whether individual municipal departments stopped more minority motorists relative to their requisite synthetic control found 11 municipal police departments to have a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories. However, the disparities did not persist in all 11 departments through doubly robust estimation. In total, there were only seven municipal police departments that withstood this more rigorous estimation procedure. Those departments are *Cumberland, Foster, Johnston, Lincoln, Middletown, North Smithfield, and Portsmouth.*

VIII.C. (2): Descriptive Statistics Analysis:

The descriptive tests are designed as an additional tool to identify disparities that exceed certain thresholds that appear in a series of census-based benchmarks. Those three benchmarks are: (1) statewide average, (2) the estimated commuter driving population, and (3) resident-only stops. Although 22 municipal police departments were identified with racial and ethnic disparities when compared to one or more of the descriptive measures, only *Providence*, *North Smithfield, and North Providence* exceeded the disparity threshold in more than half the benchmark areas.

VIII.C. (3): Stop Disposition Analysis:

In aggregate, minority motorists stopped by municipal police departments were found to have a statistically different distribution of outcomes conditional on the basis for which they were stopped. In the departmental analysis, there were 18 of 44 total departments found to have a disparity in the distribution of outcomes that was statistically significant at the 95 percent level in the Black or Hispanic alone categories. However, we note that the number of violations might be correlated with more severe outcomes and race. Since this variable is unobservable in the current data, we strongly caution the reader about drawing any conclusions from this section alone. The departments identified in this test include: *Barrington, Burrillville, Central Falls, Coventry, Cranston, East Providence, Jamestown, Johnston, Lincoln, Narragansett, Newport, North Smithfield, Pawtucket, Scituate, Smithfield, Warren, West Greenwich, and Woonsocket.*

VIII.C. (4): KPT Hit-Rate Analysis:

The results of this test, applied to the aggregate search data for all departments in Rhode Island show that departments are less successful in motorist searches across all minority groups, which is a potential indicator of disparate treatment. Examine the data separately for each individual police department; there were a total of five municipal police department found to have a disparity in the hit-rate of minority motorists relative to white Non-Hispanic motorists. The disparity in each of these departments was found to be statistically significant at the 95 percent level and fall below the threshold of a 10 percent false discovery rate.

The municipal departments identified to exhibit a statistically significant racial or ethnic disparity in searches include:

Cranston

The Cranston municipal police department was observed to have made 538 discretionary searches of which 53.9 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 27.7 percent were made of vehicles containing a Hispanic individual while 30.3 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 27 percent while that for Black motorists was 17.2 percent and Hispanic motorists was 16.8 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

East Providence

The East Providence municipal police department was observed to have made 437 discretionary searches of which 43.7 percent were made of vehicles containing at least one minority in 2017. Of the total

searches, 18.5 percent were made of vehicles containing a Hispanic individual while 30.8 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 12.6 percent while that for Black motorists was 3.2 percent and Hispanic motorists was 1.2 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

North Providence

The North Providence municipal police department was observed to have made 107 discretionary searches of which 52.3 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 23.4 percent were made of vehicles containing a Hispanic individual while 30.8 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 37.3 percent while that for Black motorists was 12.1 percent. The sample of searched Hispanic motorists did not meet the minimum necessary criteria for applying the test. The results for Black motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

Pawtucket

The Pawtucket municipal police department was observed to have made 276 discretionary searches of which 52.5 percent were made of vehicles containing at least one minority in 2017. Of the total searches, 22.5 percent were made of vehicles containing a Hispanic individual while 31.5 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 41.2 percent while that for Black motorists was 4.9 percent and Hispanic motorists was 40.3 percent. The results for Black motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

Providence

The Providence municipal police department was observed to have made 1,339 discretionary searches of which 82.6 were made of vehicles containing at least one minority in 2017. Of the total searches, 42.3 percent were made of vehicles containing a Hispanic individual while 51.7 were made of vehicles containing a Black individual. The hit-rate for white Non-Hispanic motorists was 13.7 percent while that for Black motorists was 6.5 percent and Hispanic motorists was 7.2 percent. The results for both Black and Hispanic motorists were statistically significant at a level greater than 95 percent and fell below the false discovery rate threshold of 10 percent.

VIII.D: CONCLUSIONS

All of the 2017 statewide traffic stop data analysis as presented in this report provides a screening tool which researchers, law enforcement administrators, community members and other appropriate stakeholders can use to focus attention and resources on those departments with the greatest level of disparities in their respective stop data. As noted previously, racial and ethnic disparities in any traffic

stop analysis are not, by themselves, conclusive evidence of racial profiling. Statistical disparities do, however, present significant evidence of idiosyncratic data trends that warrant further analysis[18].

Departments and community stakeholders identified with the greatest level of disparities could benefit from additional analysis. It is important to keep in mind that traffic stop disparities can be influenced by many local factors such as the location of accidents, high call for service volume areas, high crime rate areas, and areas with major traffic generators like shopping and entertainment districts, to name a few. Additionally, neighborhood demographics can vary greatly within a community. Additional considerations for a department's and community's unique characteristics would give the department and public a better understanding of why and how disparities exist.

In order to determine if a department's racial and ethnic disparities are considered statistically significant, researchers reviewed the results from the five analytical sections of the report (i.e., Solar Visibility, Synthetic Control, Descriptive Statistics, Stop Disposition, and KPT Hit-Rate). The threshold for identifying significant racial and ethnic disparities for departments is described in each section of the report (e.g., departments with a disparity that was statistically significant at the 95 percent level in the black or Hispanic alone categories in the Solar Visibility methodology were identified as statistically significant). Departments should consider additional analysis if they meet any one of the following criteria:

1. A statistically significant disparity in the solar visibility analysis
2. A statistically significant disparity in the synthetic control analyses and any one of the following analyses:
    a. Descriptive statistics
    b. Stop disposition
    c. KPT-hit rate
3. A statistically significant disparity in the descriptive statistics, stop disposition, and KPT hit-rate analyses.

Based on the above-listed criteria, the following departments: **(1) Barrington, (2) Johnston, (3) Lincoln, (4) Pawtucket, (5) Providence** and **(6) Tiverton** could benefit from additional research. Although additional analysis was conducted for Providence based on the 2016 data, both the size and the relative consistency of the disparities regarding black drivers in the Providence patrol districts caused some concern. However, at the time, it was difficult to draw meaningful conclusions about the disparities, given some limitations in the dataset and collection errors that occurred during the 2016 study year. Therefore, we concluded that additional analysis could benefit Providence and help them determine if the first year analysis results are repeated over time.

Cranston and North Smithfield were also identified with racial and ethnic disparities in this study as well as in the 2016 annual analysis; however, we do not believe additional analysis is necessary. An in-depth follow-up analysis, with recommendations, was conducted following the 2016 study for both departments. Though the racial and ethnic disparities have remained consistent in each of the annual studies for Cranston and North Smithfield, further understanding of traffic stop enforcement in those towns indicate only that the departments should continue to review and monitor traffic enforcement policies to evaluate the disproportionate effect they could be having on minority drivers. They should also

[18] Following the 2016 annual report, the authors of this report conducted additional in-depth analyses of departments identified with statistical disparities. Due to the timing of the release of the 2017 report, no additional analysis is planned.

continue to take steps to assure that their minority community is fully engaged in the process of understanding the rationale for the allocation of enforcement resources and what outcomes are being achieved.

Lastly, the Rhode Island State Police Hope Valley Barracks was also identified with racial and ethnic disparities in this study as well as the 2016 annual analysis. However, upon further review of the 2016 data, researchers determined that stops that occurred outside the boundaries of the barracks caused the disparity. When an officer assigned to the Hope Valley Barracks conducts a stop in another patrol area it was reported as a stop conducted within the Hope Valley patrol area. After modifying this study to address the issue of reporting location data, there was still a racial and ethnic disparity. We will continue to work with the Rhode Island State Police to ensure that additional data anomalies are not contributing to the disparity.

Although further analysis is important, a major objective of any review of possible racial profiling in Rhode Island is bringing law enforcement officials and community members together in an effort to build trust by discussing relationships between police and the community. Public forums should be held in each identified community to bring these groups together. They are an important tool used to inform the public of the findings and outline steps for moving forward with additional analysis. The IMRP is committed to utilizing both data and dialogue to enhance relationships between the police and their community.

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TECHNICAL APPENDICES

All tables in the technical appendix are identified by the section and table number where they can be found in the report. A complete listing is provided below.

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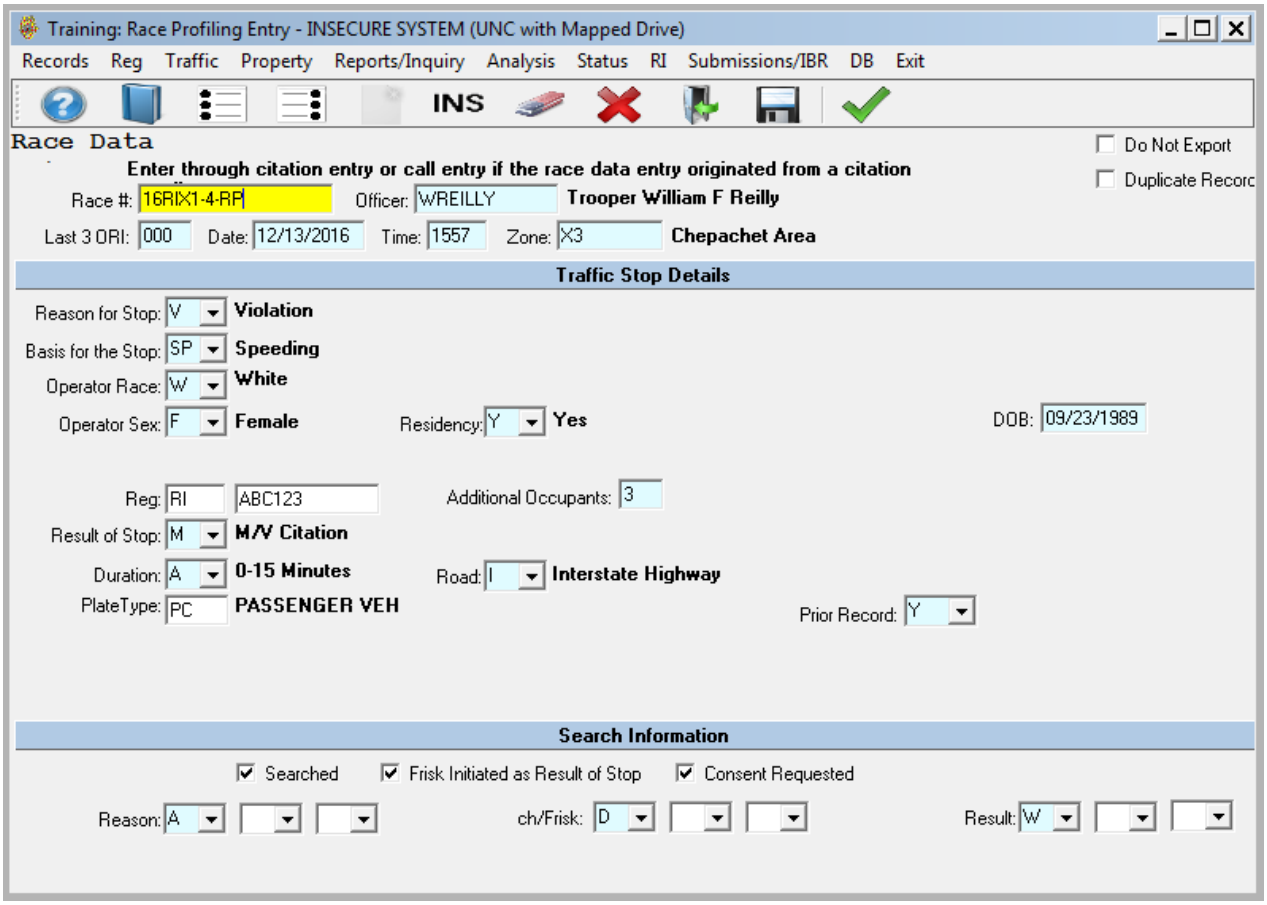
APPENDIX A

A.1: DEPARTMENT DATA COLLECTION MODULE

Figure A.1 is a screenshot of the module used by Rhode Island police departments for collecting traffic stop records.

Figure A.1: Data Collection Module Screenshot



A.2: METHODOLOGY FOR THE SOLAR VISIBILITY TEST

Let the parameter K_{ideal} capture the true level of disparate treatment for minority group *m* relative to majority group *w:*

$$K_{ideal} = \frac{P(S|V', m)P(S|V, m)}{P(S|V', w)P(S|V, w)} \quad (1)$$

The parameter captures the odds that a minority motorist is stopped during perfect visibility (V') relative to those in complete darkness (V). The parameter $K_{ideal} = 1$ in the absence of discrimination and $K_{ideal} > 1$ when minority motorists face adverse treatment.

Applying Baye's rule to Equation 1 such that:

$$K_{ideal} = \frac{P(m|V', S)P(w|V, S)}{P(w|V', S)P(m|V, S)} * \frac{P(m|V)P(w|V')}{P(w|V)P(m|V')} \quad (2)$$

The first term in K_{ideal} is the ratio of the odds that a stopped motorist is a minority during daylight relative to the same odds in darkness. Unlike Equation 1 which would detailed data on roadway demography, the odds ratio in Equation 2 can be estimated using data on stop outcomes. The second term in K_{ideal} is a measure of the relative risk-set of motorists on the roadway which captures any differences in the demographic composition of motorists associated with visibility. The second term will be equal unity if the composition of motorists is uncorrelated with solar visibility.

Assuming that the risk-set of motorists is uncorrelated with variation in solar visibility, a test statistic for K_{ideal} is then simply:

$$K_{vod} = \frac{P(m|S, \delta = 1)P(w|S, \delta = 0)}{P(w|S, \delta = 1)P(m|S, \delta = 0)} \quad (3)$$

Since we do not have continuous data on visibility, the variable δ is a binary indicator representing daylight.

The test statistic K_{vod} will be greater than or equal to the parameter K_{ideal} and exceed unity if the following conditions hold:

1) $K_{ideal} > 1$; The true parameter shows that there is a racial or ethnic disparity in the rate of minority police stops.
2) $P(V|\delta = 0) < P(V|\delta = 1)$; Darkness reduces the ability of officers to discern the race and ethnicity of motorists.
3) $\frac{P(m|V)P(w|V')}{P(w|V)P(m|V')} = 1$; The relative risk-set is constant across the analysis window.

Estimating the test statistic K_{vod} does not provide a quantitative measure for evaluating disparate treatment in policing data but does qualitatively identify the presence of disparate treatment. More

concretely, the test identifies the presence of a racial or ethnic disparity if the test statistic K_{vod} is greater than one. Given the restrictive nature of the test statistic, it is reasonable (but not conclusive) to attribute the existence of this disparity to racially biased policing practices.

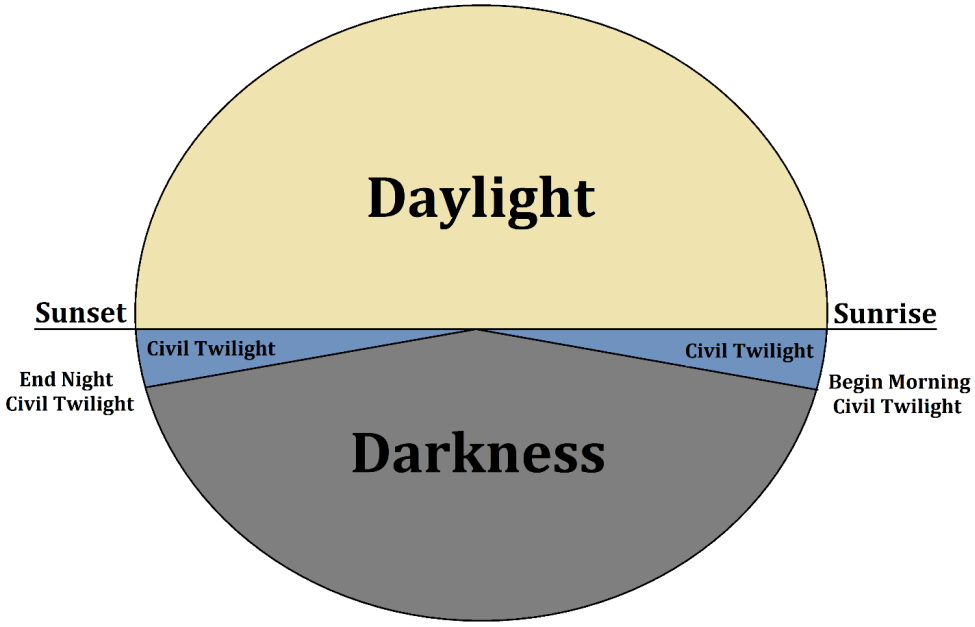
Assuming that the assumptions outlined above hold, Equation 4 can be estimated using a logistic regression in the following form:

$$ln\left(\frac{P(m|\delta)}{1-P(m|\delta)}\right) = \beta_0 + \delta + \mu \quad (4)$$

In practice, it is unlikely that the third assumption (a constant relative risk-set) will hold without including additional controls in Equation 4. Thus, we amend Equation 4 by including controls for time of day (indicators capturing 15 minute intervals), day of week, and statewide daily traffic stop volume. In estimates using data from all departments across the state, we also include department fixed-effects. The aggregate three-year sample also allows for the inclusion of officer fixed-effects.

The analysis requires that periods of darkness and daylight be properly identified. Following Grogger and Ridgeway (2006), the analysis is restricted to stops made within the inter-twilight window- that is, the time between the earliest sunset and latest end to civil twilight. As is shown in Figure A.2 (1), civil twilight is defined as the period when the sun is between zero and six degrees below the horizon and where its luminosity is transitioning from daylight to darkness. The motivation for limiting the analysis to the inter-twilight window is to help control for possible differences in the driving population.

Figure A.2 (1): Diagram of Civil Twilight and Solar Variation

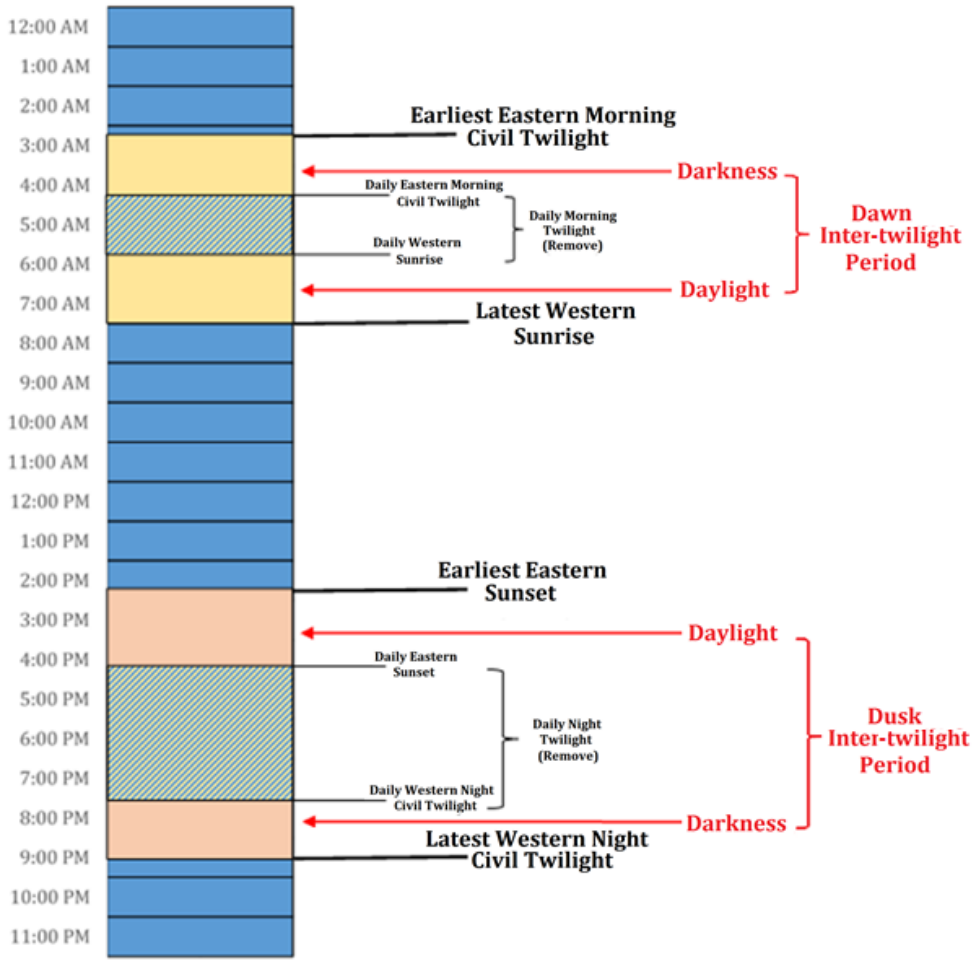


In this analysis, we rely primarily on a combined inter-twilight window that includes traffic stops made at both dawn and dusk. The dawn inter-twilight window is constructed from astronomical data and occurs in the morning hours. The dusk inter-twilight window, on the other hand, is constructed from the same astronomical data but occurs in the evening hours. The combined inter-twilight window relies on a sample

that is created by pooling these timeframes and including an additional control variable that identifies the period. The inter-twilight window was identified by attaching astronomical data from the United States Naval Observatory (USNO) to the traffic stop data. As discussed previously, past applications of this method have focused on single large urban geographies and have had no need to consider the possibilities of differential astronomical impacts. The definition for both the dawn and dusk inter-twilight windows was amended to accommodate cross-municipal variation by utilizing data from the easternmost (Newport, RI) and westernmost (Westerly, RI) points available in the USNO data.

The USNO data was merged with the policing data and used to identify the presence of darkness. Again, the presence of darkness was the primary explanatory variable used to identify the presence of racial disparities in the Rhode Island policing data. As a result, any observation in the data that occurred during twilight on any given day were dropped. The twilight period varied on a daily basis throughout the year and was identified using the USNO data. Twilight was defined in the dawn inter-twilight window as the time between the daily eastern start of civil twilight and western sunrise. Similarly, twilight was defined in the dusk inter-twilight window as the time between the daily eastern sunset and western end to civil twilight. The full delineation of the policing data is displayed graphically in Figure A.2 (2).

Figure A.2 (2): Delineation of Inter-twilight windows



A.3: METHODOLOGY FOR THE SYNTHETIC CONTROL TEST

Rosenbaum and Rubin (1983) characterize the propensity score as the probability of assignment to treatment conditional on pretreatment variables. The key insight is that conditional on this scalar function, assignment to treatment will be independent of the outcome variable. Simply put, given some *observed* pretreatment variables, it is possible to identify the conditional probability of treatment. Correctly adjusting for this conditional probability allows for the bias associated with *observed* covariates to be statistically controlled. If these observed covariates are correlated with unobserved variables, these confounding factors will also be controlled for statistically. This methodology allows for a causal interpretation of the difference between outcomes associated with treatment and control.

Hirano et al. (2003) note that a useful adjustment is to weight observations according to their propensity scores. This adjustment effectively creates a balanced sample among treatment and control observations. Conveniently, when the estimate of interest is the treatment effect on the treated, only potential control observations need to be weighted. In this context, the weight that balances the sample and removes bias associated with pretreatment confounding factors is exactly the inverse of the propensity score. Ridgeway and MacDonald (2009) apply this technique in the context of policing data by matching the joint distribution of a particular officer's stop features to those by other officers. The analysis proceeds by extending this technique for the purposes of developing synthetic controls of municipal police departments using microdata on police stops in combination with U.S. Census Bureau data on demographic and employment characteristics.

We begin using the dataset of *k* demographic and employment characteristics for county subdivision *j* in Rhode Island. This set of variables also contains characteristics including: the racial and ethnic composition of the town, age and gender demographics, population size, land area, population density, housing characteristics, commuter patterns, employment in retail and entertainment sectors, and the aggregate racial and ethnic composition of all contiguous towns. A detailed list of the stop-specific and town-level characteristics can be found in Appendix C, Table 28a. We then applied principal components analysis to reduce dimensionality and assure orthogonality. Components were selected using Guttman-Kaiser's stopping rule, which suggests only keeping those with an Eigen value of 1.2 or larger.

Formally, the *i'th* loading factor is simply:

$$w_{(i)} = \underset{\|w\| = 1}{\arg max} \left\{ \sum_k \left[w \cdot x_j \right]^2 \right\}. \quad (5)$$

Indices were then constructed for each component satisfying Guttman-Kaiser's stopping rule where:

$$y_{j,(i)} = \sum_k w_{(i)} x_j \quad (6)$$

Next, we attach the components capturing residential demographic and economic characteristics to the traffic stop data. We then conduct a second principal components analysis using variables from the traffic stop data itself, again to reduce dimensionality and ensure orthogonality. Traffic stop characteristics

include time of the day, day of the week, month, department traffic stop volume, officer traffic stop volume, and type of traffic stop.

We then estimate propensity scores for each *j* department using a logistic regression of the form:

$$ln\left(\frac{F(j)}{1-F(j)}\right) = \beta_0 + \sum_i y_{j,(i)} \quad (7)$$

Propensity score p_j are used to construct weights $w_i = 1$for the department of interest (i.e. the treatment group) and equal to $w_i = p_j/(1-p_j)$ for stops made in all other departments. Applying a propensity score weight to stops made by other departments in the state creates a synthetic control group with a comparable distribution of stop-specific and town-level characteristics. The propensity score and resulting weight for those stops with characteristics that are drastically different than stops made by the department of interest will approach zero. As a result, the synthetic control will consist of the stops that are similar, in terms of stop-specific and town-level characteristics, to those made by the department of interest. The construction of a synthetic control group using propensity scores allows the comparison to reflect the average treatment effect on the treated and abstract from potential bias in so far as the observable covariates control for selection into treatment.

Hirano and Imbens (2001) extend the weighting framework to what Robins and Ritov (1997) refer to as doubly robust estimation. That is, including additional covariates to a semi-parametric least-squares regression model enables capture of a more precise estimate of the treatment effect. It is shown in both of these discussions that such an estimator is consistent if either of the models is specified correctly. Ridgeway and MacDonald (2009) further extend the doubly robust propensity score framework to policing data. Specifically, the authors look at whether the department of interest deviates from the synthetic control along the outcome dimension. Here, we provide estimates with and without so called doubly-robust estimation of treatment effects.

Treatment effects are estimated using a logistic regression of the form:

$$ln\left(\frac{F(m)}{1-F(m)}\right) = w_i\left(\beta_0 + t(j) + \sum_i y_{j,(i)}\right) \quad (8)$$

Where $t(j)$ is an indicator of treatment and $\sum_i y_{j,(i)}$ is a series of covariates included in the propensity score where the dimensionality has been reduced using principle components. If a particular department is designated as a treatment to a group of stops, it follows that the outcome of interest would be motorist race. The question is then simply, does the intervention by a particular department result in a relatively higher stop rate of minority motorists, controlling for all observable factors? Combining inverse propensity score weighting with regression analysis allows for a more precise answer to this question. In the circumstance where the synthetic control and individual department do not perfectly match along all dimensions of stop features, there is potential for bias in any comparison, especially if those features by which they differentiate relate to a motorist's race. Doubly robust estimation helps to remove this source of potential bias by controlling for these features, resulting in a much more accurate department effect.

The share of minority motorists stopped within a department was evaluated through a direct comparison with a unique synthetic control.

Table A.3: Variables Included in Synthetic Control Methodology

Variable	Primary Town		Border Town	
	Percent	Count	Percent	Count
Male 18 to 24	X			
Male 25 to 34	X			
Male 35 to 54	X			
Male 55 to 64	X			
Male > 65	X			
Female 18 to 24	X			
Female 25 to 34	X			
Female 35 to 54	X			
Female 55 to 64	X			
Female 65+	X			
Total Population		X		X
White Population		X		X
Hispanic Population		X		X
Black Population		X		X
Asian + P.I. + N.A. Population		X		X
Other Population		X		X
Labor Force Participation	X			
Employment Rate	X			
Commute Alone	X			
Commute Carpool	X			
Commute Public Transit	X			
Commute Walk	X			
Income < 25k	X			
Income 26k to 50k	X			
Income 51k to 75k	X			
Income 76k to 100k	X			
Income 101k to 150k	X			
Income > 150k	X			
Employment Retail		X		
Employment Entertainment		X		
Vacant Housing		X		
Land Area		X		
Population Density		X		

Note 1: The source of all variables is the Census Bureau's 2016 American Community Survey 5 year estimates.
Note 2: Composite variables for border towns are constructed as weighted means where the weights are the length of each border segment.

A.4: DESCRIPTIVE STATISTICS METHODOLOGY

This section presents the methodology used to compare department-level data and three population based benchmarks commonly used across the country: (1) statewide average, (2) estimated commuter driving population, and (3) resident population. Although any one of these benchmarks cannot provide by itself a rigorous enough analysis to draw conclusions regarding racial profiling, if taken together with the more rigorous statistical methods, they do help to highlight those jurisdictions where disparities are significant and may justify further analysis. Any benchmark approach contains implicit assumptions that must be recognized and understood. The implicit assumptions are outlined in an effort to provide transparency to this research process.

A.4 (1): Problems with Approaches Using Traditional Benchmarks

A traditional approach to evaluating racial and ethnic disparities in policing data has been to apply population-based benchmarks. Although these benchmarks vary in their construction, the general methodology is consistent. Typically, the approach amounts to using residential data from the U.S Census Bureau to compare with the rate of minority traffic stops in a given geographic jurisdiction. In recent years, researchers have refined this approach by adjusting the residential census data to account for things like commuter sheds, access to vehicles, and differences over time. The population-based benchmark is an appealing approach for researchers and policymakers both because of its ease of implementation and intuitive interpretation. There are, however, numerous implicit assumptions that underlie the application of these benchmarks and are seldom presented in a transparent manner.

The goal of this analysis is to evaluate racial and ethnic disparities in the Rhode Island policing data using (1) intuitive measures that compare the data against uniformly applied benchmarks and (2) sophisticated econometric techniques that compare the data against itself without relying on benchmarks. The goal of this section is to clearly outline the assumptions that often accompany traditional benchmarks. We do, however, present two nontraditional benchmarks in this chapter that develop a more convincing approximation and can be used to descriptively assess the data. By presenting these benchmarks alongside our more econometric methods, we provide the context for our findings. In addition, the descriptive data presents jurisdictional information in cases where samples may be too small to provide statistically meaningful results from the more stringent tests.

Although there are a number of examples, the most prominent application of a population-based benchmark is a study by the San Jose Police Department (2002) that received a great deal of criticism. A more recent example is a report by researchers from Northeastern University (McDevitt et al. 2014) using Rhode Island policing data. Although adjusted and unadjusted population-based benchmarks can be intuitively appealing, they have drawn serious criticism from academics and policymakers alike because of the extent to which they are unable to account for all of the possible unobserved variables that may affect the driving population in a geography at any given time (Walker 2001; Fridell 2004; Persico and Todd 2004; Grogger and Ridgeway 2006; Mosher and Pickerill 2012). In an effort to clarify the implicit assumptions that underlie these approaches, an informal discussion of each is presented.

The implicit assumption that must be made when comparing the rate of minority stops in policing data to a population-based (or otherwise constructed) benchmark include the following.

Destination Commuter Traffic

The application of population-based benchmarks does not account for motorists who work but do not live in a given geography. Again, the application of population-based benchmarks implicitly assumes that the demographic distribution of destination commuter traffic, on average, matches the population-based benchmark. This assumption is trivial for geographies with low levels of industrial or commercial development where destination commuter traffic is small. On the other hand, areas with a high level of industrial or commercial development attract workers from neighboring geographies and this assumption becomes more tenuous. This differential impact creates a non-random distribution of error across geographies. While this shortcoming is impossible to avoid using population-based analysis, McDevitt et al. (2004) made a notable effort to adjust static residential population demographics by creating an "estimated driving populations" for jurisdictions in Rhode Island.

Pass-through Commuter Traffic

A small but not insubstantial amount of traffic also comes from pass-through commuters. Although most commuter traffic likely occurs via major highways that form the link between origin and destination geographies, the commuter traffic in some towns likely contains a component of motorists who do not live or work in a given geography but must travel through the area on their way to work. As in the previous case, the application of a population-based benchmark must implicitly assume that the demographic distribution of these motorists matches the population-based benchmark. The distribution of error associated with this assumption is, again, very likely non-random. Specifically, it seems likely that a town's proximity to a major highway may impact the level of pass-through commuter traffic from geographies further away from the major highway and, as a result, affect the magnitude of the potential error. Unfortunately, little useful data exists to quantify the extent to which this affects any particular jurisdiction. Alternatives that survey actual traffic streams are prohibitively expensive and time-consuming to conduct on a statewide basis and, unfortunately, are subject to their own set of implicit assumptions that can affect distribution of error.

Recreational Traffic

Surges in recreational traffic are not accounted for in evaluation methods that utilize population-based benchmarks. In order to apply population-based benchmarks as a test statistic, it must be implicitly assumed that the demographic distribution of recreational traffic, on average, matches the population-based benchmark. Although these assumptions are not disaggregated as with commuter traffic above, this assumption must apply to both destination and pass-through commuter traffic. Although the assumption is troublesome on its face, it becomes more concerning when considering the distribution of the associated error during specific seasons of the year. Specifically, recreational traffic likely has a differential effect across both geographic locations and over time.

Differential Exposure Rates

The exposure rate can be defined as the cumulative driving time of an individual on the road. The application of a population-based benchmark must implicitly assume that exposure rates are, on average, equivalent across demographic groups. Although exposure rates may differ based on cultural factors like driving behavior, there are also many more factors that play an important role. An example might be the differences in age distribution across racial demographics. If a specific minority population is, on average, younger, and younger motorists have a greater exposure rate than older motorists; then one might falsely attribute a racial or ethnic disparity across these groups when there is simply a different exposure to law

enforcement. Although census-based estimation methods exist to apply these demographically based exposure differences to a given population, they are best suited to situations where a single or very limited number of jurisdictions must be analyzed.

Temporal Controls

The lack of temporal controls in population-based benchmarks does not account for differences in the rate of stops across different times and days in the week. Assuming, that the above four assumptions hold and the population-based benchmark is representative of the demographic distribution of the driving population, then temporal controls are not an issue. However, if any of these assumptions do not hold, the lack of temporal controls may further magnify potential bias. Imagine that we believe the only assumption pertaining to exposure rates is invalid. It seems plausible that younger motorists are more likely to drive on weekend evenings than older motorists. If more stops were being made on weekend evenings than during the week and, as described above, minority groups were more prevalent in younger segments of the population, we might observe a racial or ethnic disparity simply because population-based benchmarks do not control for these temporal differences in policing patterns.

When one or more of the implicit assumptions associated with a population-based benchmark is violated, it can become a biased test statistic of racial disparities in policing data. Furthermore, since the source and direction of any such bias are unknown, it is impossible to determine if the bias is positive or negative, thus creating the potential for both type one (false positive) and two error (false negative). Further, the bias also is likely to be non-random across different geographies within the state. It might be that the bias disproportionately impacts urban areas compared to rural areas, tourist destinations compared to non-tourist destinations, geographies closer to highways, or based on similar policing patterns.

The question then becomes: If the assumptions inherent in population-based benchmarks make them less than ideal as indicators of possible bias, why include them in a statewide analysis of policing data? One answer is that excluding them as part of a multi-level analysis guarantees only that when others inevitably use these measures as a way to interpret the data, it is highly likely to be done inappropriately. Comparing a town's stop percentages to its residential population may not be a good way to draw conclusions about its performance but, in the absence of better alternatives, it inevitably becomes the default method for making comparisons. Providing an enhanced way to estimate the impact commuters have on the driving population and primarily analyzing the stops made during the periods of the day when those commuters are the most likely to be a significant component of the driving population improves that comparison.

Another answer to the question is that the population-based and other benchmarks are not used as indicators of bias, but rather as descriptive indicators for understanding each town's data. Since the purpose of this study is to uniformly apply a set of descriptive measures and statistical tests to all towns in order to identify possible candidates for more targeted analysis, having a broad array of possible applicable measures enhances the robustness of the screening process. Relying solely on benchmarking to accomplish this would not be effective, but using these non-statistical methods to complement and enhance the more technical evaluation results in a report that examines the data from many possible angles.

The third answer to the question is that the benchmarks and intuitive measures developed for this study can be useful in cases where an insufficient sample size make it difficult to draw meaningful conclusions from the formal statistical tests. The descriptive measures can serve a supportive role in this regard.

A.4 (2): Statewide Average Comparison

Although it is relatively easy to compare individual town stop data to the statewide average, this can be misleading if done without regard to differences in town characteristics. If, for example, the statewide average for a particular racial category of motorists stopped was 10 percent and the individual data for two towns was 18 percent and 38 percent respectively, a superficial comparison of both towns to the statewide average might suggest that the latter town, at 38 percent, could be performing less satisfactorily. However, that might not actually be the case if the town with the higher stop percentage also had a significantly higher resident population of driving age people than the statewide average. It is important to establish a context within which to make the comparisons when using the statewide average as a descriptive benchmark.

Comparing town data to statewide average data is frequently the first thing the public does when trying to understand and assess how a police department may be conducting traffic stops. Although these comparisons are inevitable and have a significant intuitive appeal, the reader is cautioned against basing any conclusions about the data exclusively upon this measure.

The method chosen to make the statewide average comparison is as follows:

- The towns that exceeded the statewide average for the three racial categories being compared to the state average were selected.
- The amount that each town's stop percentage exceeded the state average stop percentage was determined.
- The amount that each town's resident driving age population exceeded the state average for the racial group being measured was determined.
- The net differences in these two measures were determined and used to assess orders of magnitude differences in these factors.

While it is clear that a town's relative proportion of driving age residents in a racial group is not, in and of itself, capable of explaining differences in stop percentages between towns, it does provide a simple and effective way to establish a baseline for all towns from which the relative differences between town stop numbers become more apparent. To provide additional context, two additional factors were identified: (1) if the town shares a border with one or more towns whose age 16 and over resident population for that racial group exceeds the state average and (2) the percentage of nonresident motorists stopped for that racial group, in that town.

A.4 (3): Estimated Commuter Driving Population Comparison

Adjusting "static" residential census data to approximate the estimated driving demographics in a particular jurisdiction provides a more accurate benchmark method than previous census-based approaches. At any given time, nonresidents may use any road to commute to work or travel to and from entertainment venues, retail centers, tourist destinations, etc. in a particular town. It is impossible to account for all driving in a community at any given time, particularly for the random, itinerant driving trips sometimes made for entertainment or recreational purposes. However, residential census data can be modified to create a reasonable estimate of the possible presence of many nonresidents likely to be driving in a given community because they work there and live elsewhere. This methodology is an estimate of the composition of the driving population during typical commuting hours.

Previously, the most significant effort to modify census data was conducted by Northeastern University's Institute on Race and Justice. The institute created the estimated driving population (EDP) model for

traffic stop analyses in Rhode Island and Massachusetts. A summary of the steps used in the analysis is shown below in Table A.3 (1).

Table A.4 (1): Northeastern University Institute on Race and Justice Methodology for EDP Models in Rhode Island and Massachusetts

Step 1	Identify all the communities falling within a 30 mile distance of a given target community. Determine the racial and ethnic breakdown of the resident population of each of the communities in the contributing pool.
Step 2	Modify the potentially eligible contributing population of each contributing community by factoring in (a) vehicle ownership within the demographic, (b) numbers of persons within the demographic commuting more than 10 miles to work, and (c) commuting time in minutes. The modified number becomes the working estimate of those in each contributing community who may possibly be traveling to the target community for employment.
Step 3	Using four factors, (a) percentage of state employment, (b) percentage of state retail trade, (c) percentage of state food and accommodation sales, and (d) percentage of average daily road volume, rank order all communities in the state. Based on the average of all four ranking factors, place all communities in one of four groups thus approximating their ability to draw persons from the eligible nonresident pool of contributing communities.
Step 4	Determine driving population estimate for each community by combining resident and nonresident populations in proportions determined by which group the community falls into as determined in Step 3. (Range: 60% resident/40% nonresident for highest category communities to 90% resident/10% nonresident for lowest ranking communities)

Although the EDP model created by Northeastern University is a significant improvement in creating an effective benchmark, limitations of the census data at the time required certain assumptions to be made about the estimated driving population. They used information culled from certain transportation planning studies to set a limit to the towns they would include in their potential pool of nonresident commuters. Only those towns located within a 30 minute driving time of a target town were included in the nonresident portion of the EDP model. This approach assumed only those who potentially could be drawn to a community for employment, and did not account for how many people actually commute. Retail, entertainment, and other economic indicators were used to rank order communities into groups to determine the percentage of nonresident motorists to be included in the EDP. A higher rank would lead to a higher percentage of nonresidents being included in the EDP.

Since development of the Northeastern University model, significant enhancements were made to the U.S. Census Bureau data. It is now possible to get more nuanced estimates of those who identify their employment location as somewhere other than where they live. Since the 2004 effort by Northeastern University to benchmark Rhode Island and Massachusetts' data, the Census Bureau has developed new tools that can provide more targeted information that can be used to create a more useful estimated driving population for analyzing weekday daytime traffic stops.

The source of this improved data is a database known as the LEHD Origin-Destination Employer Statistics (LODES). LEHD is an acronym for "Local Employer Household Dynamics" and is a partnership between the U.S. Census Bureau and its partner states. LODES data is available through an online application called *OnTheMap* operated by the Census Bureau. The data estimates where people work and where workers live. The partnership's main purpose is to merge data from workers with data from employers to produce

a collection of synthetic and partially synthetic labor market statistics including LODES and the Quarterly Workforce Indicators.

Under the LEHD Partnership, states agree to share Unemployment Insurance earnings data and the Quarterly Census of Employment and Wages data with the Census Bureau. The LEHD program combines the administrative data, additional administrative data, and data from censuses and surveys. From these data, the program creates statistics on employment, earnings, and job flows at detailed levels of geography and industry. In addition, the LEHD program uses this data to create workers' residential patterns. The LEHD program is part of the Center for Economic Studies at the U.S. Census Bureau.

It was determined that the data available through LODES, used in conjunction with data available in the 2010 census, could provide the tools necessary to create an advanced EDP model. The result was the creation of an individualized EDP for each of the 39 towns in Rhode Island that reflects, to a certain extent, the estimated racial and ethnic demographic makeup of all persons identified in the data as working in the community but residing elsewhere. Table A.3 (2) shows the steps in this procedure.

Table A.4 (2): Central Connecticut State University Institute for Municipal and Regional Policy Methodology for EDP Model in Rhode Island

Step 1	For each town, LODES data was used to identify all those employed in the town but residing in some other location regardless of how far away they lived from the target community.
Step 2	ACS* five-year average estimated data was used to adjust for individuals commuting by some means other than driving, such as those using public transportation.
Step 3	For all Rhode Island towns contributing commuters, racial and ethnic characteristics of the commuting population were determined by using the jurisdictions' 2010 census demographics.
Step 4	For communities contributing more than 10 commuters who live outside of Rhode Island, racial and ethnic characteristics of the commuting population were determined using the jurisdictions' 2010 census demographics.
Step 5	For communities contributing fewer than 10 commuters who live outside of Rhode Island, racial and ethnic characteristics of the commuting population were determined using the demographic data for the county in which they live.
Step 6	The numbers for all commuters from the contributing towns were totaled and represent the nonresident portion of the given town's EDP. This was combined with the town's resident driving age population. The combined nonresident and resident numbers form the town's complete EDP.
Step 7	To avoid double counting, those both living and working in the target town were counted as part of the town's resident population and not its commuting population.

*American Community Survey, U.S. Census Bureau

Structured in this way, each town's EDP should reflect an improved estimate of the racial and ethnic makeup of the driving population who might be on a municipality's streets at some time during a typical weekday/daytime period. The more sophisticated methodology central to the LODES data should make this EDP, even with its inherent limitations, superior to previous uses of an EDP model. To an extent, it mirrors the process used by the Census Bureau to develop from ACS estimates the commuter-adjusted daytime populations (estimates of changes to daytime populations based on travel for employment) for minor civil divisions in several states, including Rhode Island. This type of data is subject to a margin of error based on differing sample sizes and other factors.

It is important to understand that the EDPs used in this report are a first attempt to use this tool in assessing traffic stop data. Much of the data used to create the EDPs comes from the same sources the Census Bureau used to create its commuter-adjusted daytime population estimates so it is reasonable to expect a similar range in the margins of error in the EDP. While the limitations of the model must be recognized, its value as a new tool to help understand some of the traffic stop data should not be dismissed. It represents a significant improvement over the use of resident census demographics as an elementary analytical tool and can hopefully be improved as the process of analyzing stop data progresses.

It was determined that a limited application of the EDP can be used to assess stops that occur during typical morning and evening commuting periods, when the nonresident workers have the highest probability of actually being on the road. Traffic volume and populations can change significantly during peak commuting hours. For example, Providence has a predominately Minority resident population (57 percent). According to *OnTheMap*, 88,949 people work in Providence, but live somewhere else and we are estimating that about 86 percent of those people are likely to be white. Based on the total working population it is reasonable to assume that the daytime driver population would change significantly due to workers in Providence. According to the ACS Journey to Work survey, over 70 percent of Rhode Island residents travel to work between 6:00am and 10:00am. The census currently does not have complete state level data on residents' travel from work to home. In the areas where evening commute information is available, it is consistently between the hours of 3:00pm and 7:00pm. In addition to looking at census information to understand peak commuting hours, the volume of nonresident traffic stops in several Rhode Island communities was also reviewed, based on our theory that the proportion of nonresidents stopped should increase during peak commuting hours.

The only traffic stops included in this analysis were stops conducted Monday through Friday from 6:00am to 10:00am and 3:00pm to 7:00pm (peak commuting hours). Due to the margins of error inherent in the EDP estimates, we established a reasonable set of thresholds for determining if a department shows a disparity in its stops when compared to its EDP percentages. Departments that exceed their EDP percentages by greater than 10 percentage points in any of the three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic, were identified in our tier one group. In addition, departments that exceeded their EDP percentage by more than five but less than 10 percentage points were identified in our tier two group for this benchmark if the ratio of the percentage of stops for the target group compared to the baseline measure for that group also was 1.75 or above (percentage of stops divided by benchmark percentage equals 1.75 or more) in any of the three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, or (3) Hispanic.

A.4 (4): Resident Only Stop Comparison

Some questioned the accuracy of the estimated driving population. As a result, we have limited the next part of the analysis to stops involving only residents of the community and compared them to the community demographics based on the 2010 decennial census for residents age 16 and over.

While comparing resident-only stops to resident driving age population eliminates the influence out-of-town motorists on the roads at any given time may be having on a town's stop data, the mere existence of a disparity is not in and of itself significant unless it does so by a significant amount. Such disparities may exist for several reasons including high police presence on high crime areas.

Therefore, we established a reasonable set of thresholds for determining if a department shows a significant enough disparity in its resident stops compared to its resident population to be identified. Departments with a difference of 10 percentage points or more between the resident stops and the 16+

resident population in any of the three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic, were identified in our tier one group. In addition, departments that exceeded their resident population percentage by more than five but less than 10 percentage points were identified in our tier two group for this benchmark if the ratio of the percentage of resident stops for the target group compared to the baseline measure for that group also was 1.75 or above(percentage of stopped residents divided by resident benchmark percentage equals 1.75 or more) in any of three categories: (1) Minority (all race/ethnicity), (2) Black non-Hispanic, and (3) Hispanic.

A.5: METHODOLOGY FOR THE EQUALITY OF DISPOSITION TEST

We propose a simple test of equality in the distribution of outcomes for motorists of different races conditional on the reason that they were stopped. Specifically, we test whether traffic stops made of minority motorists result in different outcomes relative to their White Non-Hispanic peers. Since ex-ante it is unclear whether discrimination would create more or less severe traffic stop outcomes in the data, we simply tests for equality in the distribution of outcomes across demography conditional on the motivating reason for the stop. To illustrate this point, imagine a simplified case where there are only two outcomes for a traffic stop- one resulting in a violation and the other resulting in a warning. On the one hand, discriminatory police officers might treat minority motorists more harshly conditional on the reason they were stopped. However, discriminatory police might also make more pretextual traffic stops for lower level offenses motivated by the fact that they may observe evidence of a more severe crime once the vehicle is stopped. In this case, we would expect that discriminatory police officers issue more warnings to minority motorists as a result of pretextual traffic stops and racial profiling. Rather than making unreasonable assumptions about the net-effect of such countervailing forces, we simply assume that the overall distribution of outcomes will not be equal across race in the presence of discrimination. The intuition is similar to hit-rate style tests but where we are unable to ex-ante sign the direction that we expect bias to take.

Here, we aggregate all search and arrest data (driver, passenger, and vehicle) into a singular aggregate statistic for whether a traffic stop resulted in these outcomes. In cases where a traffic stop resulted in a combination of outcomes, say an arrest and a ticket or where one individual in the car was searcher but others were not, we aggregate to the more severe outcome i.e. arrest in the first case and search in the latter. Since we have combined data on driver and passenger outcomes, we also amend the race variable to represent whether there was any minority person in the vehicle at the time of the stop. For example, unlike in other sections where the Hispanic category represents the demography of the driver, here it represents whether any individual in the vehicle was observed to be Hispanic.

We also aggregate the detailed outcome data into six categories, which include: (1) no search, ticket or misdemeanor, (2) no search, warning or no action, (3) no search, arrest, (4) search, ticker or misdemeanor, (5) search, warning or no action, and (6) search, arrest. Thus, we estimate the full set of *J-1* outcomes relative to a baseline outcome using multinomial logit. We assume that the log odds $\eta_{j,i}$ that a traffic stop *i* has an outcome *j* relative to the omitted baseline category (no search, ticket or misdemeanor) follows a linear model of the form

$$\eta_{j,i} = \beta_{j,0} + \beta_{\mathrm{j},1}^{T} reason_i + \beta_{\mathrm{j},2} m_i + \beta_{\mathrm{j},3}^{T} [reason_i * m_i] \qquad (9)$$

where m_i is an indicator equal to one if anyone in the vehicle is a minority and zero if the vehicle contains only White Non-Hispanic motorists. The variable $reason_i$ is a vector of indicators constructed by aggregating the detailed reason for stop data into six categories which include: (1) speed or moving, (2) equipment, (3) seatbelt or cellphone, (4) registration or license, (5) warrant or criminal activity, and (6) all other. Although omitted from Equation 10 for parsimony, we also control for potential compositional

differences across demographic groups by including gender and age. Similarly, we include a series of controls for day of week, time of day, week of year, and depending on the specification either department or officer fixed-effects.

The key variable of interest in Equation 9 is the interaction term between minority status and the motivating reason for the traffic stop. As noted, we assume only that these coefficient estimates will be statistically different than zero in the presence of discrimination and do not put any emphasis on a particular sign. To identify discrimination in context of our empirical framework, we test whether the interaction between the reason a stop was made and minority status is statistically different from zero across all six of the outcomes modeled. Thus, we operationalize our test by performing a joint chi-squared hypothesis test on the 25 interaction terms across all non-omitted outcomes and possible reasons for the stop.

We provide one important cautionary note about interpreting our test as causal evidence of discrimination. Ideally, this test would be performed on data containing *all* violations observed by the police officer prior to making a traffic stop and where we would include a control for the number of total violations. In practice, data on traffic stops typically only contain the most severe reason that motivated the stop. Imagining that minority motorists were more likely to be stopped based on police observing multiple violations, the data might show that they receive worse outcomes conditional on the primary motivating reason for the stop. However, this might be a function of the unobserved variable (i.e. number and type of secondary violation) rather than a disparity. Intuitively, it seems reasonable that motorists with multiple violations are treated differently by police relative to those with a single violation and that there might be differences across race in the probability of having multiple violations conditional on being stopped. In the absence of data on the full set of violations observed by police officers, we suggest that the reader interpret results from this test as providing descriptive evidence to be viewed in concert with other such empirical measures.

A.6: METHODOLOGY FOR THE HIT-RATE TEST

The logic of the hit-rate test follows from a simplified game theoretic exposition. In the absence of disparate treatment, the costs of searching different groups of motorists are equal. Police officers make decisions to search in an effort to maximize their expectations of finding contraband. The implication being that police will be more likely to search a group that has a higher probability of carrying contraband, i.e. participate in statistical discrimination. In turn, motorists from the targeted demography understand this aspect of police behavior and respond by lowering their rate of carrying contraband. This iterative process continues within demographic groups until, in equilibrium, it is expected that an equalization of hit-rates across groups is found.

Knowles et al. introduce disparate treatment via search costs incurred by officers that differ across demographic groups. An officer with a lower search cost for a specific demographic group will be more likely to search motorists from that group. The result of this action will be an observable increase in the number of targeted searches for that group. As above, the targeted group will respond rationally and reduce their exposure by carrying less contraband. Eventually, the added benefit associated with a higher probability of finding contraband in the non-targeted group will offset the lower cost of search for that group. As a result, one would expect the hit-rates to differ across demographic groups in the presence of disparate treatment.

Knowles et al. (2001) developed a theoretical model with testable implications that can be used to evaluate statistical disparities in the rate of searches across demographic groups. Following Knowles et al. an empirical test of the null hypothesis (that no racial or ethnic disparity exists) in Equation 10 is presented.

$$P(H = 1 \mid m, S) = P(H = 1|S\ ) \ \forall\ r, c \tag{10}$$

Equation 10 computes the probability of a search resulting in a hit across different demographic groups. If the null hypothesis was true and there was no racial or ethnic disparity across these groups, one would expect the hit-rates across minority and non-minority groups to reach equilibrium. As discussed previously, this expectation stems from a game-theoretic model where officers and motorists optimize their behaviors based on knowledge of the other party's actions. In more concrete terms, one would expect motorists to lower their propensity to carry contraband as searches increase while officers would raise their propensity to search vehicles that are more likely to have contraband. Essentially, the model allows for statistical discrimination but finds if there is bias-based discrimination.

An important cautionary note about hit-rate tests related to an implicit infra-marginality assumption. Specifically, several papers have explored generalizations and extensions of the framework and found that, in certain circumstances, empirical testing using hit-rate tests can suffer from the infra-marginality problem as well as differences in the direction of bias across officers (see Antonovics and Knight 2004; Anwar and Fang 2006; Dharmapala and Ross 2003). Knowles and his colleagues responded to these critiques with further refinements of their model that provide additional evidence of its validity (Persico and Todd 2004). Although the results from a hit-rate analysis help contextualize post-stop activity within departments, the results should only be considered as supplementary evidence.

APPENDIX B

Table B.1: Rate of Traffic Stops per 1,000 Residents (Sorted Alphabetically)

Town Name	2010 16 and Over Census Pop.	2017 Traffic Stops	Stops per Resident	Stops per 1,000 Residents
State of Rhode Island	857,232	251,186	0.29	293
Barrington	12,367	4,958	0.40	401
Bristol	19,780	6,817	0.34	345
Burrillville	12,861	4,295	0.33	334
Central Falls	14,379	3,974	0.28	276
Charlestown	6,524	2,529	0.39	388
Coventry	28,302	7,195	0.25	254
Cranston	66,140	27,273	0.41	412
Cumberland	26,946	5,035	0.19	187
East Greenwich	10,202	2,258	0.22	221
East Providence	39,050	10,153	0.26	260
Foster	3,790	1,985	0.52	524
Glocester	7,963	2,368	0.30	297
Hopkinton	6,586	2,265	0.34	344
Jamestown	4,533	1,407	0.31	310
Johnston	23,975	5,348	0.22	223
Lincoln	16,995	1,957	0.12	115
Little Compton	2,925	1,396	0.48	477
Middletown	12,911	4,756	0.37	368
Narragansett	13,937	5,466	0.39	392
Newport	21,076	6,544	0.31	310
North Kingstown	21,033	5,206	0.25	248
North Providence	27,300	5,816	0.21	213
North Smithfield	9,857	3,554	0.36	361
Pawtucket	56,572	14,360	0.25	254
Portsmouth	13,947	7,668	0.55	550
Providence	141,451	15,340	0.11	108
Richmond	6,080	1,566	0.26	258
Scituate	8,415	2,828	0.34	336
Smithfield	18,325	5,279	0.29	288
South Kingstown	25,974	5,506	0.21	212
Tiverton	13,168	4,807	0.37	365
Warren	8,910	2,789	0.31	313
Warwick	68,889	12,019	0.17	174
West Greenwich	4,854	904	0.19	186
West Warwick	24,051	4,804	0.20	200
Westerly	18,571	6,109	0.33	329
Woonsocket	32,349	5,417	0.17	167

Table B.2: Basis for Stop (Sorted by % Speeding)

Department Name	Total	Speeding	APB	Call for Service	Equipment/ Inspection Violation	Motorist Assist	Other Traffic Violation	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
Glocester	2,368	80.9%	0.0%	2.3%	4.1%	0.1%	8.6%	0.0%	3.9%	0.1%	0.0%	0.0%
Foster	1,985	77.4%	0.0%	0.7%	9.6%	1.0%	9.1%	0.9%	1.3%	0.1%	0.0%	0.0%
West Greenwich	904	65.7%	0.0%	1.1%	13.7%	0.1%	10.8%	6.2%	1.2%	1.1%	0.0%	0.0%
Scituate	2,828	65.3%	0.0%	1.7%	6.3%	0.1%	19.2%	3.1%	3.6%	0.6%	0.0%	0.0%
Burrillville	4,295	64.5%	0.0%	1.7%	18.8%	0.1%	8.7%	3.5%	2.0%	0.5%	0.1%	0.0%
Charlestown	2,529	62.0%	0.3%	2.7%	13.7%	0.4%	17.6%	2.5%	0.2%	0.5%	0.1%	0.1%
Richmond	1,566	59.0%	0.1%	1.9%	8.0%	0.1%	15.3%	12.5%	2.0%	1.1%	0.0%	0.0%
Hopkinton	2,265	56.2%	0.0%	1.5%	16.4%	1.2%	14.2%	2.9%	6.5%	0.9%	0.1%	0.1%
Jamestown	1,407	55.6%	0.2%	1.8%	14.7%	0.3%	24.0%	1.0%	1.7%	0.6%	0.1%	0.0%
North Kingstown	5,206	50.0%	0.6%	2.2%	17.1%	2.0%	24.0%	2.3%	0.5%	1.2%	0.0%	0.0%
Lincoln	1,957	48.0%	0.2%	6.9%	8.0%	0.6%	28.9%	2.2%	4.1%	1.0%	0.1%	0.0%
Portsmouth	7,668	47.9%	0.1%	0.7%	24.2%	0.8%	21.4%	0.1%	4.7%	0.2%	0.0%	0.0%
Narragansett	5,466	47.8%	0.3%	2.1%	13.0%	1.2%	31.8%	1.7%	1.0%	0.8%	0.1%	0.2%
South Kingstown	5,506	47.8%	0.5%	4.7%	6.1%	1.5%	28.3%	7.2%	2.1%	1.4%	0.3%	0.2%
East Greenwich	2,258	46.4%	0.1%	3.7%	11.4%	1.3%	31.0%	0.3%	5.0%	0.6%	0.2%	0.0%
Little Compton	1,396	46.3%	0.1%	0.6%	26.9%	0.1%	13.0%	4.9%	7.5%	0.2%	0.1%	0.1%
DEM	263	43.3%	0.4%	4.2%	2.3%	1.5%	27.8%	1.5%	4.9%	3.4%	10.6%	0.0%
West Warwick	4,804	41.7%	0.1%	4.6%	19.5%	0.3%	24.7%	6.2%	1.5%	1.1%	0.3%	0.0%
RISP - Hope Valley	8,148	41.5%	0.3%	2.8%	15.6%	0.2%	22.1%	8.1%	8.9%	0.2%	0.1%	0.1%
RISP - Wickford	9,831	40.5%	0.2%	3.6%	18.0%	0.2%	17.2%	8.5%	11.7%	0.0%	0.2%	0.1%
Barrington	4,958	38.8%	0.0%	0.7%	25.8%	0.2%	16.4%	12.2%	4.3%	1.0%	0.4%	0.1%
Westerly	6,109	37.5%	0.3%	2.8%	20.5%	0.0%	28.3%	4.5%	5.3%	0.6%	0.2%	0.1%
Cumberland	5,035	36.2%	0.1%	3.3%	23.2%	0.7%	26.4%	3.7%	5.4%	0.5%	0.3%	0.2%
Coventry	7,195	36.0%	0.1%	2.9%	30.5%	0.1%	25.2%	3.0%	1.9%	0.3%	0.0%	0.0%
Middletown	4,756	34.4%	0.2%	1.6%	13.0%	0.1%	27.9%	13.0%	9.3%	0.1%	0.4%	0.0%
RISP - Chepachet	6,927	33.0%	0.1%	4.5%	17.6%	0.9%	13.6%	14.5%	15.5%	0.1%	0.2%	0.0%
Johnston	5,348	32.5%	0.1%	9.3%	21.5%	0.1%	26.6%	4.6%	4.1%	0.6%	0.5%	0.1%
East Providence	10,153	30.7%	0.1%	3.2%	28.1%	0.4%	22.6%	6.9%	4.7%	1.8%	1.1%	0.4%
Central Falls	3,974	28.4%	0.1%	2.0%	10.3%	0.1%	36.3%	6.0%	15.6%	0.5%	0.7%	0.2%
RISP - Lincoln	10,980	27.5%	0.1%	5.7%	18.3%	0.3%	21.4%	8.8%	17.4%	0.1%	0.3%	0.1%
Bristol	6,817	27.3%	0.0%	1.9%	16.4%	0.0%	35.9%	6.0%	11.9%	0.2%	0.3%	0.0%
Warwick	12,019	27.1%	0.1%	9.2%	15.0%	1.9%	34.6%	5.2%	5.6%	0.8%	0.5%	0.1%
Smithfield	5,279	26.8%	0.1%	9.6%	15.1%	0.6%	27.4%	13.5%	5.3%	1.3%	0.1%	0.2%
Warren	2,789	26.5%	0.2%	3.5%	14.9%	0.4%	23.4%	20.6%	9.1%	0.6%	0.7%	0.1%
Pawtucket	14,360	25.8%	0.1%	4.0%	13.5%	0.4%	47.4%	1.5%	5.7%	1.2%	0.3%	0.1%

Table B.2: Basis for Stop (Sorted by % Speeding)

Department Name	Total	Speeding	APB	Call for Service	Equipment/ Inspection Violation	Motorist Assist	Other Traffic Violation	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
North Smithfield	3,554	25.4%	0.1%	1.6%	36.7%	0.1%	26.1%	4.8%	3.3%	0.3%	1.3%	0.2%
RISP - HQ	2,188	23.2%	0.1%	2.5%	26.2%	0.7%	36.1%	3.2%	7.5%	0.3%	0.1%	0.1%
Tiverton	4,807	22.1%	0.1%	1.6%	21.1%	0.4%	29.9%	4.1%	19.4%	0.9%	0.2%	0.2%
URI	898	21.5%	0.1%	1.2%	20.8%	1.7%	41.4%	0.9%	6.5%	5.8%	0.1%	0.0%
North Providence	5,816	20.3%	0.0%	2.3%	35.5%	0.4%	26.4%	2.8%	11.7%	0.4%	0.1%	0.1%
Woonsocket	5,417	18.3%	0.9%	9.7%	16.2%	0.6%	38.0%	6.0%	5.0%	2.8%	1.4%	1.0%
Newport	6,544	17.8%	0.1%	3.0%	28.4%	0.1%	47.9%	1.3%	1.0%	0.2%	0.1%	0.0%
Cranston	27,273	16.7%	0.0%	1.2%	27.1%	0.3%	41.0%	6.7%	3.2%	1.2%	2.6%	0.1%
Providence	15,340	13.6%	0.5%	7.2%	15.5%	1.9%	41.9%	6.3%	3.0%	7.4%	2.6%	0.0%

Table B.3: Basis for Stop (Sorted by % Other Traffic Violation)

Department Name	Total	Other Traffic Violation	Speeding	APB	Call for Service	Equipment/ Inspection Violation	Motorist Assist	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
Newport	6,544	47.9%	17.8%	0.1%	3.0%	28.4%	0.1%	1.3%	1.0%	0.2%	0.1%	0.0%
Pawtucket	14,360	47.4%	25.8%	0.1%	4.0%	13.5%	0.4%	1.5%	5.7%	1.2%	0.3%	0.1%
Providence	15,340	41.9%	13.6%	0.5%	7.2%	15.5%	1.9%	6.3%	3.0%	7.4%	2.6%	0.0%
URI	898	41.4%	21.5%	0.1%	1.2%	20.8%	1.7%	0.9%	6.5%	5.8%	0.1%	0.0%
Cranston	27,273	41.0%	16.7%	0.0%	1.2%	27.1%	0.3%	6.7%	3.2%	1.2%	2.6%	0.1%
Woonsocket	5,417	38.0%	18.3%	0.9%	9.7%	16.2%	0.6%	6.0%	5.0%	2.8%	1.4%	1.0%
Central Falls	3,974	36.3%	28.4%	0.1%	2.0%	10.3%	0.1%	6.0%	15.6%	0.5%	0.7%	0.2%
RISP - HQ	2,188	36.1%	23.2%	0.1%	2.5%	26.2%	0.7%	3.2%	7.5%	0.3%	0.1%	0.1%
Bristol	6,817	35.9%	27.3%	0.0%	1.9%	16.4%	0.0%	6.0%	11.9%	0.2%	0.3%	0.0%
Warwick	12,019	34.6%	27.1%	0.1%	9.2%	15.0%	1.9%	5.2%	5.6%	0.8%	0.5%	0.1%
Narragansett	5,466	31.8%	47.8%	0.3%	2.1%	13.0%	1.2%	1.7%	1.0%	0.8%	0.1%	0.2%
East Greenwich	2,258	31.0%	46.4%	0.1%	3.7%	11.4%	1.3%	0.3%	5.0%	0.6%	0.2%	0.0%
Tiverton	4,807	29.9%	22.1%	0.1%	1.6%	21.1%	0.4%	4.1%	19.4%	0.9%	0.2%	0.2%
Lincoln	1,957	28.9%	48.0%	0.2%	6.9%	8.0%	0.6%	2.2%	4.1%	1.0%	0.1%	0.0%
South Kingstown	5,506	28.3%	47.8%	0.5%	4.7%	6.1%	1.5%	7.2%	2.1%	1.4%	0.3%	0.2%
Westerly	6,109	28.3%	37.5%	0.3%	2.8%	20.5%	0.0%	4.5%	5.3%	0.6%	0.2%	0.1%
Middletown	4,756	27.9%	34.4%	0.2%	1.6%	13.0%	0.1%	13.0%	9.3%	0.1%	0.4%	0.0%
DEM	263	27.8%	43.3%	0.4%	4.2%	2.3%	1.5%	1.5%	4.9%	3.4%	10.6%	0.0%
Smithfield	5,279	27.4%	26.8%	0.1%	9.6%	15.1%	0.6%	13.5%	5.3%	1.3%	0.1%	0.2%
Johnston	5,348	26.6%	32.5%	0.1%	9.3%	21.5%	0.1%	4.6%	4.1%	0.6%	0.5%	0.1%
North Providence	5,816	26.4%	20.3%	0.0%	2.3%	35.5%	0.4%	2.8%	11.7%	0.4%	0.1%	0.1%
Cumberland	5,035	26.4%	36.2%	0.1%	3.3%	23.2%	0.7%	3.7%	5.4%	0.5%	0.3%	0.2%
North Smithfield	3,554	26.1%	25.4%	0.1%	1.6%	36.7%	0.1%	4.8%	3.3%	0.3%	1.3%	0.2%
Coventry	7,195	25.2%	36.0%	0.1%	2.9%	30.5%	0.1%	3.0%	1.9%	0.3%	0.0%	0.0%
West Warwick	4,804	24.7%	41.7%	0.1%	4.6%	19.5%	0.3%	6.2%	1.5%	1.1%	0.3%	0.0%
North Kingstown	5,206	24.0%	50.0%	0.6%	2.2%	17.1%	2.0%	2.3%	0.5%	1.2%	0.0%	0.0%
Jamestown	1,407	24.0%	55.6%	0.2%	1.8%	14.7%	0.3%	1.0%	1.7%	0.6%	0.1%	0.0%
Warren	2,789	23.4%	26.5%	0.2%	3.5%	14.9%	0.4%	20.6%	9.1%	0.6%	0.7%	0.1%
East Providence	10,153	22.6%	30.7%	0.1%	3.2%	28.1%	0.4%	6.9%	4.7%	1.8%	1.1%	0.4%
RISP - Hope Valley	8,148	22.1%	41.5%	0.3%	2.8%	15.6%	0.2%	8.1%	8.9%	0.2%	0.1%	0.1%
RISP - Lincoln	10,980	21.4%	27.5%	0.1%	5.7%	18.3%	0.3%	8.8%	17.4%	0.1%	0.3%	0.1%
Portsmouth	7,668	21.4%	47.9%	0.1%	0.7%	24.2%	0.8%	0.1%	4.7%	0.2%	0.0%	0.0%
Scituate	2,828	19.2%	65.3%	0.0%	1.7%	6.3%	0.1%	3.1%	3.6%	0.6%	0.0%	0.0%
Charlestown	2,529	17.6%	62.0%	0.3%	2.7%	13.7%	0.4%	2.5%	0.2%	0.5%	0.1%	0.1%
RISP - Wickford	9,831	17.2%	40.5%	0.2%	3.6%	18.0%	0.2%	8.5%	11.7%	0.0%	0.2%	0.1%

Table B.3: Basis for Stop (Sorted by % Other Traffic Violation)

Department Name	Total	Other Traffic Violation	Speeding	APB	Call for Service	Equipment/ Inspection Violation	Motorist Assist	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
Barrington	4,958	16.4%	38.8%	0.0%	0.7%	25.8%	0.2%	12.2%	4.3%	1.0%	0.4%	0.1%
Richmond	1,566	15.3%	59.0%	0.1%	1.9%	8.0%	0.1%	12.5%	2.0%	1.1%	0.0%	0.0%
Hopkinton	2,265	14.2%	56.2%	0.0%	1.5%	16.4%	1.2%	2.9%	6.5%	0.9%	0.1%	0.1%
RISP - Chepachet	6,927	13.6%	33.0%	0.1%	4.5%	17.6%	0.9%	14.5%	15.5%	0.1%	0.2%	0.0%
Little Compton	1,396	13.0%	46.3%	0.1%	0.6%	26.9%	0.1%	4.9%	7.5%	0.2%	0.1%	0.1%
West Greenwich	904	10.8%	65.7%	0.0%	1.1%	13.7%	0.1%	6.2%	1.2%	1.1%	0.0%	0.0%
Foster	1,985	9.1%	77.4%	0.0%	0.7%	9.6%	1.0%	0.9%	1.3%	0.1%	0.0%	0.0%
Burrillville	4,295	8.7%	64.5%	0.0%	1.7%	18.8%	0.1%	3.5%	2.0%	0.5%	0.1%	0.0%
Glocester	2,368	8.6%	80.9%	0.0%	2.3%	4.1%	0.1%	0.0%	3.9%	0.1%	0.0%	0.0%

Table B.4: Basis for Stop (Sorted by % Equipment/Inspection Violation)

Department Name	Total	Equipment/ Inspection Violation	Speeding	APB	Call for Service	Motorist Assist	Other Traffic Violation	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
North Smithfield	3,554	36.7%	25.4%	0.1%	1.6%	0.1%	26.1%	4.8%	3.3%	0.3%	1.3%	0.2%
North Providence	5,816	35.5%	20.3%	0.0%	2.3%	0.4%	26.4%	2.8%	11.7%	0.4%	0.1%	0.1%
Coventry	7,195	30.5%	36.0%	0.1%	2.9%	0.1%	25.2%	3.0%	1.9%	0.3%	0.0%	0.0%
Newport	6,544	28.4%	17.8%	0.1%	3.0%	0.1%	47.9%	1.3%	1.0%	0.2%	0.1%	0.0%
East Providence	10,153	28.1%	30.7%	0.1%	3.2%	0.4%	22.6%	6.9%	4.7%	1.8%	1.1%	0.4%
Cranston	27,273	27.1%	16.7%	0.0%	1.2%	0.3%	41.0%	6.7%	3.2%	1.2%	2.6%	0.1%
Little Compton	1,396	26.9%	46.3%	0.1%	0.6%	0.1%	13.0%	4.9%	7.5%	0.2%	0.1%	0.1%
RISP - HQ	2,188	26.2%	23.2%	0.1%	2.5%	0.7%	36.1%	3.2%	7.5%	0.3%	0.1%	0.1%
Barrington	4,958	25.8%	38.8%	0.0%	0.7%	0.2%	16.4%	12.2%	4.3%	1.0%	0.4%	0.1%
Portsmouth	7,668	24.2%	47.9%	0.1%	0.7%	0.8%	21.4%	0.1%	4.7%	0.2%	0.0%	0.0%
Cumberland	5,035	23.2%	36.2%	0.1%	3.3%	0.7%	26.4%	3.7%	5.4%	0.5%	0.3%	0.2%
Johnston	5,348	21.5%	32.5%	0.1%	9.3%	0.1%	26.6%	4.6%	4.1%	0.6%	0.5%	0.1%
Tiverton	4,807	21.1%	22.1%	0.1%	1.6%	0.4%	29.9%	4.1%	19.4%	0.9%	0.2%	0.2%
URI	898	20.8%	21.5%	0.1%	1.2%	1.7%	41.4%	0.9%	6.5%	5.8%	0.1%	0.0%
Westerly	6,109	20.5%	37.5%	0.3%	2.8%	0.0%	28.3%	4.5%	5.3%	0.6%	0.2%	0.1%
West Warwick	4,804	19.5%	41.7%	0.1%	4.6%	0.3%	24.7%	6.2%	1.5%	1.1%	0.3%	0.0%
Burrillville	4,295	18.8%	64.5%	0.0%	1.7%	0.1%	8.7%	3.5%	2.0%	0.5%	0.1%	0.0%
RISP - Lincoln	10,980	18.3%	27.5%	0.1%	5.7%	0.3%	21.4%	8.8%	17.4%	0.1%	0.3%	0.1%
RISP - Wickford	9,831	18.0%	40.5%	0.2%	3.6%	0.2%	17.2%	8.5%	11.7%	0.0%	0.2%	0.1%
RISP - Chepachet	6,927	17.6%	33.0%	0.1%	4.5%	0.9%	13.6%	14.5%	15.5%	0.1%	0.2%	0.0%
North Kingstown	5,206	17.1%	50.0%	0.6%	2.2%	2.0%	24.0%	2.3%	0.5%	1.2%	0.0%	0.0%
Hopkinton	2,265	16.4%	56.2%	0.0%	1.5%	1.2%	14.2%	2.9%	6.5%	0.9%	0.1%	0.1%
Bristol	6,817	16.4%	27.3%	0.0%	1.9%	0.0%	35.9%	6.0%	11.9%	0.2%	0.3%	0.0%
Woonsocket	5,417	16.2%	18.3%	0.9%	9.7%	0.6%	38.0%	6.0%	5.0%	2.8%	1.4%	1.0%
RISP - Hope Valley	8,148	15.6%	41.5%	0.3%	2.8%	0.2%	22.1%	8.1%	8.9%	0.2%	0.1%	0.1%
Providence	15,340	15.5%	13.6%	0.5%	7.2%	1.9%	41.9%	6.3%	3.0%	7.4%	2.6%	0.0%
Smithfield	5,279	15.1%	26.8%	0.1%	9.6%	0.6%	27.4%	13.5%	5.3%	1.3%	0.1%	0.2%
Warwick	12,019	15.0%	27.1%	0.1%	9.2%	1.9%	34.6%	5.2%	5.6%	0.8%	0.5%	0.1%
Warren	2,789	14.9%	26.5%	0.2%	3.5%	0.4%	23.4%	20.6%	9.1%	0.6%	0.7%	0.1%
Jamestown	1,407	14.7%	55.6%	0.2%	1.8%	0.3%	24.0%	1.0%	1.7%	0.6%	0.1%	0.0%
Charlestown	2,529	13.7%	62.0%	0.3%	2.7%	0.4%	17.6%	2.5%	0.2%	0.5%	0.1%	0.1%
West Greenwich	904	13.7%	65.7%	0.0%	1.1%	0.1%	10.8%	6.2%	1.2%	1.1%	0.0%	0.0%
Pawtucket	14,360	13.5%	25.8%	0.1%	4.0%	0.4%	47.4%	1.5%	5.7%	1.2%	0.3%	0.1%
Narragansett	5,466	13.0%	47.8%	0.3%	2.1%	1.2%	31.8%	1.7%	1.0%	0.8%	0.1%	0.2%
Middletown	4,756	13.0%	34.4%	0.2%	1.6%	0.1%	27.9%	13.0%	9.3%	0.1%	0.4%	0.0%

Table B.4: Basis for Stop (Sorted by % Equipment/Inspection Violation)

Department Name	Total	Equipment/ Inspection Violation	Speeding	APB	Call for Service	Motorist Assist	Other Traffic Violation	Registration Violation	Seatbelt	Suspicious Person	Violation of ordinance	Warrant
East Greenwich	2,258	11.4%	46.4%	0.1%	3.7%	1.3%	31.0%	0.3%	5.0%	0.6%	0.2%	0.0%
Central Falls	3,974	10.3%	28.4%	0.1%	2.0%	0.1%	36.3%	6.0%	15.6%	0.5%	0.7%	0.2%
Foster	1,985	9.6%	77.4%	0.0%	0.7%	1.0%	9.1%	0.9%	1.3%	0.1%	0.0%	0.0%
Richmond	1,566	8.0%	59.0%	0.1%	1.9%	0.1%	15.3%	12.5%	2.0%	1.1%	0.0%	0.0%
Lincoln	1,957	8.0%	48.0%	0.2%	6.9%	0.6%	28.9%	2.2%	4.1%	1.0%	0.1%	0.0%
Scituate	2,828	6.3%	65.3%	0.0%	1.7%	0.1%	19.2%	3.1%	3.6%	0.6%	0.0%	0.0%
South Kingstown	5,506	6.1%	47.8%	0.5%	4.7%	1.5%	28.3%	7.2%	2.1%	1.4%	0.3%	0.2%
Glocester	2,368	4.1%	80.9%	0.0%	2.3%	0.1%	8.6%	0.0%	3.9%	0.1%	0.0%	0.0%
DEM	263	2.3%	43.3%	0.4%	4.2%	1.5%	27.8%	1.5%	4.9%	3.4%	10.6%	0.0%

Table B.5: Outcome of Stop (Sorted by % Citation)

Department Name	N	Citation	Warning	Notice and Demand	Arrest Driver	Arrest Passenger	No Action
Johnston	5,348	76.9%	18.4%	0.1%	1.5%	0.2%	2.9%
Pawtucket	14,360	76.7%	18.1%	1.8%	1.4%	0.1%	2.1%
North Providence	5,816	71.4%	27.3%	0.0%	0.7%	0.0%	0.5%
Central Falls	3,974	64.5%	29.3%	0.5%	4.8%	0.1%	0.9%
RISP - Lincoln	10,980	64.0%	31.5%	0.3%	2.2%	0.5%	1.5%
RISP - Hope Valley	8,148	59.5%	37.2%	0.1%	1.3%	0.2%	1.6%
Smithfield	5,279	58.6%	28.7%	1.3%	2.7%	0.1%	8.7%
RISP - Chepachet	6,927	58.1%	35.2%	0.0%	2.0%	0.4%	4.3%
Glocester	2,368	57.5%	41.8%	0.0%	0.3%	0.0%	0.3%
RISP - Wickford	9,831	57.2%	38.8%	0.1%	1.2%	0.3%	2.4%
Scituate	2,828	56.9%	38.7%	0.2%	3.3%	0.1%	0.7%
RISP - HQ	2,188	54.8%	11.4%	3.6%	4.3%	0.1%	25.8%
Richmond	1,566	53.9%	44.6%	0.4%	1.0%	0.0%	0.1%
Warren	2,789	53.0%	33.6%	6.2%	2.4%	0.1%	4.7%
West Warwick	4,804	49.9%	40.5%	0.9%	5.0%	0.1%	3.5%
East Greenwich	2,258	47.0%	48.0%	0.2%	1.9%	0.3%	2.6%
Lincoln	1,957	46.9%	45.8%	0.3%	3.1%	0.2%	3.8%
East Providence	10,153	45.7%	44.3%	4.7%	2.5%	0.6%	2.2%
Middletown	4,756	44.8%	54.7%	0.0%	0.4%	0.0%	0.1%
North Kingstown	5,206	42.9%	48.7%	0.8%	2.9%	0.1%	4.5%
Cumberland	5,035	42.6%	43.6%	5.2%	6.3%	0.5%	1.9%
Woonsocket	5,417	41.4%	48.1%	0.8%	4.9%	0.6%	4.3%
North Smithfield	3,554	40.4%	40.1%	9.1%	8.1%	0.5%	1.8%
West Greenwich	904	39.5%	55.2%	0.7%	2.0%	0.0%	2.7%
Warwick	12,019	38.8%	48.3%	0.8%	5.8%	0.1%	6.1%
Hopkinton	2,265	37.6%	51.7%	4.6%	1.7%	0.4%	4.1%
Westerly	6,109	34.7%	62.6%	0.1%	1.7%	0.1%	0.7%
Tiverton	4,807	33.3%	58.3%	1.3%	2.9%	0.1%	4.1%
Bristol	6,817	32.8%	66.3%	0.6%	0.3%	0.0%	0.0%
Providence	15,340	31.7%	52.3%	0.9%	5.3%	0.6%	9.2%
URI	898	31.2%	58.9%	1.3%	2.4%	0.0%	6.1%
Narragansett	5,466	29.4%	62.6%	0.2%	4.8%	0.2%	2.8%
DEM	263	29.3%	57.4%	0.0%	4.6%	0.4%	8.4%
Portsmouth	7,668	28.6%	63.8%	3.4%	2.5%	0.2%	1.5%
Burrillville	4,295	26.4%	70.8%	0.0%	2.1%	0.0%	0.7%
Foster	1,985	25.4%	72.7%	0.0%	1.4%	0.2%	0.3%
Coventry	7,195	24.5%	73.2%	0.7%	1.1%	0.0%	0.5%
Cranston	27,273	24.3%	66.5%	0.7%	1.8%	0.2%	6.6%
South Kingstown	5,506	22.6%	67.1%	1.5%	3.1%	0.2%	5.4%
Barrington	4,958	21.7%	73.3%	0.4%	2.8%	0.1%	1.7%
Jamestown	1,407	17.1%	72.9%	6.0%	1.1%	0.0%	2.8%
Charlestown	2,529	15.2%	76.9%	1.5%	2.0%	0.0%	4.4%
Little Compton	1,396	10.5%	88.0%	0.0%	0.8%	0.3%	0.5%
Newport	6,544	7.0%	92.5%	0.0%	0.4%	0.0%	0.1%

Table B.6: Outcome of Stop (Sorted by % Warning)

Department Name	N	Warning	Citation	Notice and Demand	Arrest Driver	Arrest Passenger	No Action
Newport	6,544	92.5%	7.0%	0.0%	0.4%	0.0%	0.1%
Little Compton	1,396	88.0%	10.5%	0.0%	0.8%	0.3%	0.5%
Charlestown	2,529	76.9%	15.2%	1.5%	2.0%	0.0%	4.4%
Barrington	4,958	73.3%	21.7%	0.4%	2.8%	0.1%	1.7%
Coventry	7,195	73.2%	24.5%	0.7%	1.1%	0.0%	0.5%
Jamestown	1,407	72.9%	17.1%	6.0%	1.1%	0.0%	2.8%
Foster	1,985	72.7%	25.4%	0.0%	1.4%	0.2%	0.3%
Burrillville	4,295	70.8%	26.4%	0.0%	2.1%	0.0%	0.7%
South Kingstown	5,506	67.1%	22.6%	1.5%	3.1%	0.2%	5.4%
Cranston	27,273	66.5%	24.3%	0.7%	1.8%	0.2%	6.6%
Bristol	6,817	66.3%	32.8%	0.6%	0.3%	0.0%	0.0%
Portsmouth	7,668	63.8%	28.6%	3.4%	2.5%	0.2%	1.5%
Narragansett	5,466	62.6%	29.4%	0.2%	4.8%	0.2%	2.8%
Westerly	6,109	62.6%	34.7%	0.1%	1.7%	0.1%	0.7%
URI	898	58.9%	31.2%	1.3%	2.4%	0.0%	6.1%
Tiverton	4,807	58.3%	33.3%	1.3%	2.9%	0.1%	4.1%
DEM	263	57.4%	29.3%	0.0%	4.6%	0.4%	8.4%
West Greenwich	904	55.2%	39.5%	0.7%	2.0%	0.0%	2.7%
Middletown	4,756	54.7%	44.8%	0.0%	0.4%	0.0%	0.1%
Providence	15,340	52.3%	31.7%	0.9%	5.3%	0.6%	9.2%
Hopkinton	2,265	51.7%	37.6%	4.6%	1.7%	0.4%	4.1%
North Kingstown	5,206	48.7%	42.9%	0.8%	2.9%	0.1%	4.5%
Warwick	12,019	48.3%	38.8%	0.8%	5.8%	0.1%	6.1%
Woonsocket	5,417	48.1%	41.4%	0.8%	4.9%	0.6%	4.3%
East Greenwich	2,258	48.0%	47.0%	0.2%	1.9%	0.3%	2.6%
Lincoln	1,957	45.8%	46.9%	0.3%	3.1%	0.2%	3.8%
Richmond	1,566	44.6%	53.9%	0.4%	1.0%	0.0%	0.1%
East Providence	10,153	44.3%	45.7%	4.7%	2.5%	0.6%	2.2%
Cumberland	5,035	43.6%	42.6%	5.2%	6.3%	0.5%	1.9%
Glocester	2,368	41.8%	57.5%	0.0%	0.3%	0.0%	0.3%
West Warwick	4,804	40.5%	49.9%	0.9%	5.0%	0.1%	3.5%
North Smithfield	3,554	40.1%	40.4%	9.1%	8.1%	0.5%	1.8%
RISP - Wickford	9,831	38.8%	57.2%	0.1%	1.2%	0.3%	2.4%
Scituate	2,828	38.7%	56.9%	0.2%	3.3%	0.1%	0.7%
RISP - Hope Valley	8,148	37.2%	59.5%	0.1%	1.3%	0.2%	1.6%
RISP - Chepachet	6,927	35.2%	58.1%	0.0%	2.0%	0.4%	4.3%
Warren	2,789	33.6%	53.0%	6.2%	2.4%	0.1%	4.7%
RISP - Lincoln	10,980	31.5%	64.0%	0.3%	2.2%	0.5%	1.5%
Central Falls	3,974	29.3%	64.5%	0.5%	4.8%	0.1%	0.9%
Smithfield	5,279	28.7%	58.6%	1.3%	2.7%	0.1%	8.7%
North Providence	5,816	27.3%	71.4%	0.0%	0.7%	0.0%	0.5%
Johnston	5,348	18.4%	76.9%	0.1%	1.5%	0.2%	2.9%
Pawtucket	14,360	18.1%	76.7%	1.8%	1.4%	0.1%	2.1%
RISP - HQ	2,188	11.4%	54.8%	3.6%	4.3%	0.1%	25.8%

Table B.7: Outcome of Stop (Sorted by % Arrest)

Department Name	N	Arrest	Citation	Warning	Notice and Demand	No Action
Johnston	5,348	1.7%	76.9%	18.4%	0.1%	2.9%
Pawtucket	14,360	1.4%	76.7%	18.1%	1.8%	2.1%
North Providence	5,816	0.7%	71.4%	27.3%	0.0%	0.5%
Central Falls	3,974	4.9%	64.5%	29.3%	0.5%	0.9%
RISP - Lincoln	10,980	2.7%	64.0%	31.5%	0.3%	1.5%
RISP - Hope Valley	8,148	1.4%	59.5%	37.2%	0.1%	1.6%
Smithfield	5,279	2.7%	58.6%	28.7%	1.3%	8.7%
RISP - Chepachet	6,927	2.4%	58.1%	35.2%	0.0%	4.3%
Glocester	2,368	0.3%	57.5%	41.8%	0.0%	0.3%
RISP - Wickford	9,831	1.5%	57.2%	38.8%	0.1%	2.4%
Scituate	2,828	3.4%	56.9%	38.7%	0.2%	0.7%
RISP - HQ	2,188	4.3%	54.8%	11.4%	3.6%	25.8%
Richmond	1,566	1.0%	53.9%	44.6%	0.4%	0.1%
Warren	2,789	2.5%	53.0%	33.6%	6.2%	4.7%
West Warwick	4,804	5.1%	49.9%	40.5%	0.9%	3.5%
East Greenwich	2,258	2.3%	47.0%	48.0%	0.2%	2.6%
Lincoln	1,957	3.3%	46.9%	45.8%	0.3%	3.8%
East Providence	10,153	3.1%	45.7%	44.3%	4.7%	2.2%
Middletown	4,756	0.4%	44.8%	54.7%	0.0%	0.1%
North Kingstown	5,206	3.0%	42.9%	48.7%	0.8%	4.5%
Cumberland	5,035	6.8%	42.6%	43.6%	5.2%	1.9%
Woonsocket	5,417	5.5%	41.4%	48.1%	0.8%	4.3%
North Smithfield	3,554	8.6%	40.4%	40.1%	9.1%	1.8%
West Greenwich	904	2.0%	39.5%	55.2%	0.7%	2.7%
Warwick	12,019	6.0%	38.8%	48.3%	0.8%	6.1%
Hopkinton	2,265	2.0%	37.6%	51.7%	4.6%	4.1%
Westerly	6,109	1.8%	34.7%	62.6%	0.1%	0.7%
Tiverton	4,807	3.0%	33.3%	58.3%	1.3%	4.1%
Bristol	6,817	0.3%	32.8%	66.3%	0.6%	0.0%
Providence	15,340	6.0%	31.7%	52.3%	0.9%	9.2%
URI	898	2.4%	31.2%	58.9%	1.3%	6.1%
Narragansett	5,466	5.0%	29.4%	62.6%	0.2%	2.8%
DEM	263	4.9%	29.3%	57.4%	0.0%	8.4%
Portsmouth	7,668	2.7%	28.6%	63.8%	3.4%	1.5%
Burrillville	4,295	2.1%	26.4%	70.8%	0.0%	0.7%
Foster	1,985	1.6%	25.4%	72.7%	0.0%	0.3%
Coventry	7,195	1.1%	24.5%	73.2%	0.7%	0.5%
Cranston	27,273	2.0%	24.3%	66.5%	0.7%	6.6%
South Kingstown	5,506	3.4%	22.6%	67.1%	1.5%	5.4%
Barrington	4,958	2.9%	21.7%	73.3%	0.4%	1.7%
Jamestown	1,407	1.1%	17.1%	72.9%	6.0%	2.8%
Charlestown	2,529	2.0%	15.2%	76.9%	1.5%	4.4%
Little Compton	1,396	1.1%	10.5%	88.0%	0.0%	0.5%
Newport	6,544	0.4%	7.0%	92.5%	0.0%	0.1%

Table B.8: Number of Searches (Sorted by % Search)

Department Name	Stops	Searches		Contraband	
		N	%	N	%
Providence	15,340	1,633	10.65%	183	11.21%
DEM (Environmental Mgmt.)	263	17	6.46%	1	5.88%
Little Compton	1,396	87	6.23%	18	20.69%
Woonsocket	5,417	309	5.70%	58	18.77%
East Providence	10,153	571	5.62%	73	12.78%
Jamestown	1,407	79	5.61%	11	13.92%
Hopkinton	2,265	127	5.61%	20	15.75%
Cranston	27,273	1,461	5.36%	284	19.44%
Burrillville	4,295	226	5.26%	45	19.91%
West Greenwich	904	46	5.09%	11	23.91%
Barrington	4,958	242	4.88%	63	26.03%
North Kingstown	5,206	248	4.76%	83	33.47%
Portsmouth	7,668	363	4.73%	74	20.39%
Westerly	6,109	283	4.63%	63	22.26%
Middletown	4,756	217	4.56%	41	18.89%
South Kingstown	5,506	246	4.47%	62	25.20%
North Providence	5,816	252	4.33%	55	21.83%
Warren	2,789	110	3.94%	33	30.00%
Lincoln	1,957	76	3.88%	14	18.42%
RISP - Lincoln	10,980	411	3.74%	114	27.74%
Foster	1,985	74	3.73%	25	33.78%
North Smithfield	3,554	132	3.71%	40	30.30%
URI	898	33	3.67%	6	18.18%
Pawtucket	14,360	522	3.64%	154	29.50%
RISP - Hope Valley	8,148	293	3.60%	84	28.67%
RISP - Chepachet	6,927	249	3.59%	55	22.09%
Richmond	1,566	56	3.58%	26	46.43%
West Warwick	4,804	161	3.35%	47	29.19%
Central Falls	3,974	133	3.35%	31	23.31%
RISP - Wickford	9,831	329	3.35%	99	30.09%
Smithfield	5,279	172	3.26%	52	30.23%
East Greenwich	2,258	73	3.23%	16	21.92%
Coventry	7,195	230	3.20%	75	32.61%
Scituate	2,828	90	3.18%	17	18.89%
Charlestown	2,529	79	3.12%	28	35.44%
Tiverton	4,807	144	3.00%	43	29.86%
Newport	6,544	195	2.98%	41	21.03%
RISP - HQ	2,188	65	2.97%	17	26.15%
Cumberland	5,035	147	2.92%	39	26.53%
Bristol	6,817	197	2.89%	71	36.04%
Narragansett	5,466	156	2.85%	38	24.36%
Warwick	12,019	337	2.80%	86	25.52%
Johnston	5,348	145	2.71%	42	28.97%
Glocester	2,368	54	2.28%	16	29.63%

APPENDIX C

Table C.1: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All Traffic Stops 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.149***	0.175***	0.151***	0.142***
	Standard Error	(0.032)	(0.037)	(0.034)	(0.030)
Sample Size		49164	46674	46136	53410
Pseudo R^2		0.098	0.115	0.120	0.115

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

Table C.2: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All Municipal Traffic Stops 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.082**	0.155***	0.143***	0.134***
	Standard Error	(0.039)	(0.043)	(0.034)	(0.032)
Sample Size		45030	43200	42640	49251
Pseudo R^2		0.107	0.125	0.128	0.123

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

Table C.3: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All State Police Traffic Stops 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.375***	0.462***	0.239*	0.261***
	Standard Error	(0.105)	(0.120)	(0.125)	(0.090)
Sample Size		3321	3124	3149	3809
Pseudo R^2		0.061	0.061	0.075	0.064

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all traffic stops made during the inter-twilight window in 2017.

Table C.4: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All Moving Violations 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.138***	0.149***	0.142***	0.120***
	Standard Error	(0.041)	(0.048)	(0.035)	(0.034)
Sample Size		34623	32270	31924	36865
Pseudo R^2		0.100	0.118	0.127	0.120

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

Table C.5: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All Municipal Moving Violations 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.035	0.115*	0.142***	0.111***
	Standard Error	(0.054)	(0.059)	(0.035)	(0.035)
Sample Size		31637	29893	29608	34081
Pseudo R^2		0.105	0.125	0.134	0.128

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

Table C.6: Logistic Regression of Minority Status on Daylight with Officer Fixed Effects, All State Police Moving Violations 2017

LHS: Minority Status		Non-Caucasian	Black	Hispanic	Black or Hispanic
Daylight	Coefficient	0.407***	0.513***	0.136	0.237**
	Standard Error	(0.108)	(0.142)	(0.172)	(0.107)
Sample Size		2208	2041	2013	2483
Pseudo R^2		0.059	0.059	0.070	0.061

Note 1: The coefficients are presented as log odds-ratios along with standard errors clustered at the department level. A coefficient concatenated with * represents a p-value of .1, ** represents a p-value of .05, and *** represents a p-value of .01 significance.
Note 2: All specifications include controls for time of the day, day of the week, analysis year, and department fixed-effects.
Note 3: Sample includes all moving violations made during the inter-twilight window in 2017.

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	-0.111	-0.009	1.608***	0.768***
	Standard Error	(0.326)	(0.382)	(0.433)	(0.293)
	P-Value	0.734	0.980	0.001	0.008
	Q-Value	N/A	N/A	0.001	0.068
	Effective Sample	836	785	763	836
	Pseudo R2	0.032	0.037	0.105	0.046
Bristol	Coefficient	0.368	0.365	-0.314	0.019
	Standard Error	(0.312)	(0.337)	(0.393)	(0.264)
	P-Value	0.239	0.279	0.425	0.940
	Q-Value	0.474	0.507	N/A	0.954
	Effective Sample	2011	1997	1988	2139
	Pseudo R2	0.032	0.046	0.041	0.018
Burrillville	Coefficient	-0.112	-0.086	0.652	0.141
	Standard Error	(0.423)	(0.485)	(0.426)	(0.363)
	P-Value	0.788	0.856	0.126	0.697
	Q-Value	N/A	N/A	0.324	0.853
	Effective Sample	896	888	831	1020
	Pseudo R2	0.037	0.037	0.070	0.048
Central Falls	Coefficient	0.254	0.263	-0.093	-0.032
	Standard Error	(0.240)	(0.244)	(0.172)	(0.162)
	P-Value	0.289	0.280	0.592	0.841
	Q-Value	0.508	0.507	N/A	N/A
	Effective Sample	735	726	1150	1356
	Pseudo R2	0.026	0.023	0.024	0.018
Charlestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Coventry	Coefficient	-0.039	0.421	-0.483	0.107
	Standard Error	(0.384)	(0.472)	(0.588)	(0.370)
	P-Value	0.917	0.370	0.411	0.773
	Q-Value	N/A	0.595	N/A	0.853
	Effective Sample	1244	1173	930	1361
	Pseudo R2	0.030	0.061	0.065	0.050
Cranston	Coefficient	0.284***	0.294***	0.375***	0.319***
	Standard Error	(0.074)	(0.078)	(0.075)	(0.064)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.001	0.001
	Effective Sample	5308	5045	5274	6338
	Pseudo R2	0.008	0.009	0.010	0.008

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Cumberland	Coefficient	0.564+	0.865++	-0.171	0.168
	Standard Error	(0.301)	(0.384)	(0.259)	(0.226)
	P-Value	0.061	0.024	0.509	0.455
	Q-Value	0.216	0.108	N/A	0.666
	Effective Sample	948	919	956	1015
	Pseudo R2	0.034	0.035	0.039	0.019
DEM	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Providence	Coefficient	-0.263++	-0.152	-0.093	-0.126
	Standard Error	(0.114)	(0.119)	(0.160)	(0.107)
	P-Value	0.021	0.202	0.564	0.238
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	2703	2621	2331	2858
	Pseudo R2	0.021	0.019	0.018	0.017
Foster	Coefficient	N/A	N/A	N/A	-0.305
	Standard Error	N/A	N/A	N/A	(0.331)
	P-Value	N/A	N/A	N/A	0.356
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	517
	Pseudo R2	N/A	N/A	N/A	0.079
Glocester	Coefficient	-1.241++	-1.907+++	0.119	-0.795+
	Standard Error	(0.495)	(0.651)	(0.586)	(0.432)
	P-Value	0.012	0.003	0.838	0.065
	Q-Value	N/A	N/A	0.890	N/A
	Effective Sample	690	587	624	648
	Pseudo R2	0.122	0.144	0.065	0.061
Hopkinton	Coefficient	0.300	0.462	0.751	0.583
	Standard Error	(0.400)	(0.467)	(0.667)	(0.416)
	P-Value	0.455	0.323	0.259	0.160
	Q-Value	0.666	0.549	0.501	0.368
	Effective Sample	604	529	509	614
	Pseudo R2	0.068	0.072	0.086	0.071

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Jamestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Johnston	Coefficient	0.467+	0.469+	0.243	0.312
	Standard Error	(0.266)	(0.273)	(0.231)	(0.200)
	P-Value	0.079	0.086	0.293	0.118
	Q-Value	0.240	0.252	0.508	0.314
	Effective Sample	1240	1211	1259	1390
	Pseudo R2	0.045	0.054	0.059	0.057
Lincoln	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Little Compton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Middletown	Coefficient	1.457***	1.381***	0.165	0.842++
	Standard Error	(0.470)	(0.497)	(0.444)	(0.382)
	P-Value	0.002	0.006	0.708	0.028
	Q-Value	0.024	0.052	0.853	0.112
	Effective Sample	690	677	630	730
	Pseudo R2	0.063	0.071	0.039	0.043
Narragansett	Coefficient	-0.532+	-0.685++	0.184	-0.286
	Standard Error	(0.300)	(0.326)	(0.354)	(0.247)
	P-Value	0.075	0.035	0.603	0.247
	Q-Value	N/A	N/A	0.828	N/A
	Effective Sample	1410	1392	1298	1451
	Pseudo R2	0.028	0.035	0.037	0.024
Newport	Coefficient	0.046	-0.057	-0.136	-0.101
	Standard Error	(0.157)	(0.171)	(0.223)	(0.148)
	P-Value	0.772	0.739	0.538	0.490
	Q-Value	0.853	N/A	N/A	N/A
	Effective Sample	1595	1546	1430	1678
	Pseudo R2	0.008	0.010	0.025	0.010

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
North Kingstown	Coefficient	-1.986+++	-0.564	-0.409	-0.513
	Standard Error	(0.393)	(0.587)	(0.603)	(0.472)
	P-Value	0.001	0.335	0.497	0.277
	Q-Value	0.001	N/A	N/A	N/A
	Effective Sample	868	753	703	824
	Pseudo R2	0.133	0.079	0.086	0.061
North Providence	Coefficient	0.052	0.059	0.469++	0.211
	Standard Error	(0.178)	(0.186)	(0.211)	(0.157)
	P-Value	0.768	0.745	0.027	0.178
	Q-Value	0.853	0.853	0.112	0.374
	Effective Sample	1044	1021	991	1202
	Pseudo R2	0.020	0.020	0.039	0.018
North Smithfield	Coefficient	-0.476++	-0.513++	-0.119	-0.321
	Standard Error	(0.232)	(0.259)	(0.250)	(0.196)
	P-Value	0.041	0.048	0.633	0.103
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	834	796	815	923
	Pseudo R2	0.052	0.052	0.029	0.028
Pawtucket	Coefficient	0.153	0.167	0.317**	0.233++
	Standard Error	(0.115)	(0.118)	(0.128)	(0.101)
	P-Value	0.180	0.153	0.013	0.021
	Q-Value	0.374	0.363	0.079	0.104
	Effective Sample	2409	2357	2220	2900
	Pseudo R2	0.023	0.025	0.012	0.017
Portsmouth	Coefficient	0.054	0.019	0.647+	0.257
	Standard Error	(0.263)	(0.289)	(0.351)	(0.237)
	P-Value	0.834	0.944	0.064	0.275
	Q-Value	0.890	0.954	0.216	0.507
	Effective Sample	1399	1381	1333	1435
	Pseudo R2	0.028	0.025	0.050	0.018
Providence	Coefficient	0.151	0.180+	0.061	0.075
	Standard Error	(0.100)	(0.101)	(0.101)	(0.090)
	P-Value	0.129	0.075	0.542	0.405
	Q-Value	0.324	0.237	0.768	0.638
	Effective Sample	2815	2712	2741	3792
	Pseudo R2	0.013	0.014	0.008	0.008
Richmond	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
RISP - Chepachet	Coefficient	N/A	N/A	N/A	-0.156
	Standard Error	N/A	N/A	N/A	(0.293)
	P-Value	N/A	N/A	N/A	0.596
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	558
	Pseudo R2	N/A	N/A	N/A	0.020
RISP - Hope Valley	Coefficient	0.546**	0.864***	0.159	0.546**
	Standard Error	(0.224)	(0.263)	(0.291)	(0.219)
	P-Value	0.014	0.001	0.583	0.013
	Q-Value	0.085	0.014	0.814	0.079
	Effective Sample	836	775	757	875
	Pseudo R2	0.035	0.048	0.037	0.035
RISP - HQ	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
RISP - Lincoln	Coefficient	0.409**	0.532***	0.158	0.263
	Standard Error	(0.174)	(0.203)	(0.202)	(0.168)
	P-Value	0.018	0.008	0.437	0.118
	Q-Value	0.096	0.068	0.666	0.314
	Effective Sample	1154	1004	987	1249
	Pseudo R2	0.026	0.032	0.028	0.021
RISP - Wickford	Coefficient	0.017	0.104	0.199	0.079
	Standard Error	(0.238)	(0.252)	(0.264)	(0.209)
	P-Value	0.943	0.677	0.451	0.699
	Q-Value	0.954	0.853	0.666	0.853
	Effective Sample	895	864	837	978
	Pseudo R2	0.023	0.027	0.034	0.024
Scituate	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Smithfield	Coefficient	0.409+	0.345	-0.006	0.179
	Standard Error	(0.223)	(0.238)	(0.252)	(0.187)
	P-Value	0.065	0.146	0.980	0.337
	Q-Value	0.216	0.356	N/A	0.561
	Effective Sample	1205	1181	1137	1289
	Pseudo R2	0.032	0.030	0.046	0.029

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
South Kingstown	Coefficient	-0.002	0.421	0.179	0.437+
	Standard Error	(0.254)	(0.303)	(0.404)	(0.259)
	P-Value	0.994	0.166	0.657	0.092
	Q-Value	N/A	0.368	0.853	0.259
	Effective Sample	1213	1177	1126	1217
	Pseudo R2	0.023	0.035	0.048	0.026
Tiverton	Coefficient	0.007	0.035	1.590**	0.726+
	Standard Error	(0.388)	(0.456)	(0.660)	(0.379)
	P-Value	0.985	0.938	0.016	0.056
	Q-Value	0.985	0.954	0.085	0.216
	Effective Sample	897	810	899	929
	Pseudo R2	0.035	0.039	0.116	0.052
Univ Of Rhode Island	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Warren	Coefficient	0.266	0.671	0.223	0.549
	Standard Error	(0.398)	(0.509)	(0.619)	(0.400)
	P-Value	0.504	0.187	0.718	0.170
	Q-Value	0.725	0.381	0.853	0.368
	Effective Sample	789	741	691	810
	Pseudo R2	0.039	0.046	0.046	0.037
Warwick	Coefficient	0.263+	0.391***	-0.224	0.035
	Standard Error	(0.140)	(0.150)	(0.142)	(0.112)
	P-Value	0.061	0.009	0.112	0.748
	Q-Value	0.216	0.068	N/A	0.853
	Effective Sample	2649	2600	2622	2889
	Pseudo R2	0.012	0.014	0.014	0.009
West Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
West Warwick	Coefficient	-0.643+++	0.079	-0.356	-0.083
	Standard Error	(0.216)	(0.257)	(0.282)	(0.207)
	P-Value	0.003	0.758	0.207	0.685
	Q-Value	N/A	0.853	N/A	N/A
	Effective Sample	1385	1319	1305	1387
	Pseudo R2	0.052	0.067	0.054	0.043

Table C.7: Logistic Regression of Minority Status on Daylight by Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Westerly	Coefficient	-0.158	0.115	0.151	0.101
	Standard Error	(0.282)	(0.368)	(0.467)	(0.296)
	P-Value	0.575	0.754	0.745	0.734
	Q-Value	N/A	0.853	0.853	0.853
	Effective Sample	1156	1131	904	1154
	Pseudo R2	0.029	0.045	0.039	0.035
Woonsocket	Coefficient	0.372***	0.229	-0.054	0.037
	Standard Error	(0.134)	(0.243)	(0.187)	(0.159)
	P-Value	0.006	0.344	0.769	0.811
	Q-Value	0.052	0.563	N/A	0.884
	Effective Sample	1798	1243	1347	1477
	Pseudo R2	0.029	0.028	0.028	0.019

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	-0.165	-0.010	1.460***	0.748**
	Standard Error	836	731	745	817
	P-Value	0.564	0.978	0.001	0.032
	Q-Value	0.070	0.108	0.129	0.082
	Effective Sample	N/A	N/A	0.001	0.075
	Pseudo R2	(0.287)	(0.421)	(0.375)	(0.349)
Bristol	Coefficient	0.521+	0.524	-0.317	0.085
	Standard Error	1813	1799	1799	2082
	P-Value	0.082	0.148	0.340	0.778
	Q-Value	0.082	0.082	0.092	0.050
	Effective Sample	0.173	0.275	N/A	0.855
	Pseudo R2	(0.298)	(0.361)	(0.333)	(0.301)
Burrillville	Coefficient	-0.092	0.017	1.072**	0.310
	Standard Error	896	861	726	988
	P-Value	0.791	0.964	0.017	0.439
	Q-Value	0.043	0.064	0.119	0.070
	Effective Sample	N/A	0.964	0.050	0.587
	Pseudo R2	(0.347)	(0.414)	(0.453)	(0.402)
Central Falls	Coefficient	0.446	0.453	-0.028	0.028
	Standard Error	733	724	1142	1348
	P-Value	0.328	0.335	0.901	0.913
	Q-Value	0.059	0.056	0.039	0.035
	Effective Sample	0.509	0.512	N/A	0.929
	Pseudo R2	(0.456)	(0.469)	(0.232)	(0.266)
Charlestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Coventry	Coefficient	0.045	0.758**	-0.485	0.259
	Standard Error	1092	987	730	1271
	P-Value	0.897	0.028	0.345	0.391
	Q-Value	0.061	0.100	0.090	0.072
	Effective Sample	0.929	0.068	N/A	0.546
	Pseudo R2	(0.344)	(0.344)	(0.513)	(0.301)
Cranston	Coefficient	0.287***	0.296***	0.379***	0.326***
	Standard Error	5256	4979	5248	6318
	P-Value	0.001	0.004	0.001	0.001
	Q-Value	0.061	0.068	0.059	0.057
	Effective Sample	0.008	0.018	0.001	0.001
	Pseudo R2	(0.089)	(0.104)	(0.101)	(0.098)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Cumberland	Coefficient	0.649+	0.929***	-0.018	0.263**
	Standard Error	939	903	891	999
	P-Value	0.090	0.001	0.837	0.024
	Q-Value	0.056	0.070	0.065	0.046
	Effective Sample	0.188	0.001	N/A	0.061
	Pseudo R2	(0.384)	(0.259)	(0.093)	(0.116)
DEM	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Providence	Coefficient	-0.155	-0.027	0.030	-0.004
	Standard Error	2683	2601	2330	2857
	P-Value	0.127	0.740	0.736	0.958
	Q-Value	0.048	0.048	0.043	0.043
	Effective Sample	N/A	N/A	0.820	N/A
	Pseudo R2	(0.101)	(0.082)	(0.092)	(0.071)
Foster	Coefficient	N/A	N/A	N/A	-0.337
	Standard Error	N/A	N/A	N/A	517
	P-Value	N/A	N/A	N/A	0.381
	Q-Value	N/A	N/A	N/A	0.090
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	(0.384)
Glocester	Coefficient	-1.187+	-1.991++	0.351	-0.665
	Standard Error	672	569	606	630
	P-Value	0.059	0.017	0.481	0.243
	Q-Value	0.134	0.150	0.116	0.083
	Effective Sample	N/A	N/A	0.625	N/A
	Pseudo R2	(0.632)	(0.842)	(0.497)	(0.569)
Hopkinton	Coefficient	0.370	N/A	1.023***	0.680
	Standard Error	550	N/A	500	602
	P-Value	0.412	N/A	0.006	0.202
	Q-Value	0.082	N/A	0.111	0.086
	Effective Sample	0.560	N/A	0.023	0.338
	Pseudo R2	(0.451)	N/A	(0.372)	(0.532)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Jamestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Johnston	Coefficient	0.460***	0.455***	0.192++	0.244***
	Standard Error	1202	1173	1247	1385
	P-Value	0.008	0.008	0.050	0.004
	Q-Value	0.059	0.070	0.083	0.079
	Effective Sample	0.028	0.028	0.111	0.018
	Pseudo R2	(0.173)	(0.172)	(0.097)	(0.086)
Lincoln	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Little Compton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Middletown	Coefficient	1.389***	1.319***	0.182	0.903***
	Standard Error	664	648	557	704
	P-Value	0.001	0.002	0.728	0.001
	Q-Value	0.097	0.116	0.061	0.075
	Effective Sample	0.008	0.010	0.820	0.008
	Pseudo R2	(0.437)	(0.428)	(0.527)	(0.284)
Narragansett	Coefficient	-0.532	-0.648	0.273	-0.257
	Standard Error	1315	1297	1208	1395
	P-Value	0.275	0.243	0.158	0.428
	Q-Value	0.045	0.061	0.083	0.052
	Effective Sample	N/A	N/A	0.282	N/A
	Pseudo R2	(0.488)	(0.555)	(0.194)	(0.326)
Newport	Coefficient	0.064	-0.043	-0.158	-0.109
	Standard Error	1565	1516	1347	1652
	P-Value	0.639	0.787	0.207	0.335
	Q-Value	0.037	0.041	0.043	0.035
	Effective Sample	0.762	N/A	N/A	N/A
	Pseudo R2	(0.136)	(0.158)	(0.125)	(0.114)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
North Kingstown	Coefficient	-1.953+++	-0.643	-0.034	-0.368
	Standard Error	851	683	534	790
	P-Value	0.001	0.223	0.962	0.377
	Q-Value	0.157	0.114	0.123	0.089
	Effective Sample	0.001	N/A	N/A	N/A
	Pseudo R2	(0.439)	(0.527)	(0.712)	(0.416)
North Providence	Coefficient	0.090	0.104	0.449***	0.221**
	Standard Error	1036	1013	984	1194
	P-Value	0.513	0.499	0.001	0.017
	Q-Value	0.048	0.054	0.052	0.037
	Effective Sample	0.638	0.629	0.001	0.048
	Pseudo R2	(0.138)	(0.152)	(0.104)	(0.092)
North Smithfield	Coefficient	-0.344+	-0.347	-0.024	-0.214
	Standard Error	829	768	804	918
	P-Value	0.059	0.149	0.954	0.486
	Q-Value	0.085	0.090	0.064	0.063
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	(0.182)	(0.239)	(0.414)	(0.307)
Pawtucket	Coefficient	0.146	0.158	0.234***	0.194***
	Standard Error	2400	2348	2219	2892
	P-Value	0.175	0.146	0.001	0.004
	Q-Value	0.061	0.065	0.048	0.056
	Effective Sample	0.305	0.275	0.001	0.018
	Pseudo R2	(0.108)	(0.108)	(0.067)	(0.068)
Portsmouth	Coefficient	0.074	0.057	0.787***	0.305
	Standard Error	1399	1381	1223	1435
	P-Value	0.786	0.852	0.001	0.122
	Q-Value	0.048	0.050	0.072	0.043
	Effective Sample	0.855	0.916	0.001	0.241
	Pseudo R2	(0.273)	(0.312)	(0.190)	(0.197)
Providence	Coefficient	0.151***	0.180***	0.061**	0.075***
	Standard Error	2815	2712	2741	3792
	P-Value	0.001	0.001	0.020	0.001
	Q-Value	0.013	0.014	0.008	0.008
	Effective Sample	0.007	0.007	0.057	0.001
	Pseudo R2	(0.013)	(0.013)	(0.027)	(0.014)
Richmond	Coefficient	N/A	N/A	N/A	-0.141
	Standard Error	N/A	N/A	N/A	538
	P-Value	N/A	N/A	N/A	0.704
	Q-Value	N/A	N/A	N/A	0.111
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	(0.372)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
RISP - Chepachet	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
RISP - Hope Valley	Coefficient	0.704***	1.016***	0.263	0.640**
	Standard Error	821	733	754	872
	P-Value	0.004	0.008	0.453	0.023
	Q-Value	0.097	0.104	0.090	0.085
	Effective Sample	0.018	0.028	0.597	0.061
	Pseudo R2	(0.250)	(0.386)	(0.351)	(0.282)
RISP - HQ	Coefficient	0.386**	0.501**	0.224	0.280+
	Standard Error	1149	992	982	1244
	P-Value	0.039	0.017	0.275	0.071
	Q-Value	0.065	0.052	0.046	0.037
	Effective Sample	0.090	0.048	0.437	0.157
	Pseudo R2	(0.187)	(0.209)	(0.206)	(0.156)
RISP - Lincoln	Coefficient	0.202	0.264	0.298	0.184
	Standard Error	864	823	804	978
	P-Value	0.375	0.222	0.379	0.395
	Q-Value	0.064	0.070	0.101	0.075
	Effective Sample	0.540	0.365	0.540	0.546
	Pseudo R2	(0.228)	(0.216)	(0.337)	(0.216)
RISP - Wickford	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Scituate	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Smithfield	Coefficient	0.342	0.266	-0.023	0.142
	Standard Error	1165	1108	1075	1239
	P-Value	0.181	0.354	0.929	0.488
	Q-Value	0.052	0.052	0.064	0.043
	Effective Sample	0.310	0.532	N/A	0.625
	Pseudo R2	(0.256)	(0.289)	(0.261)	(0.204)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
South Kingstown	Coefficient	0.016	0.400**	0.145	0.411**
	Standard Error	1199	1154	933	1194
	P-Value	0.917	0.030	0.575	0.014
	Q-Value	0.046	0.064	0.059	0.050
	Effective Sample	0.929	0.075	0.695	0.048
	Pseudo R2	(0.155)	(0.186)	(0.259)	(0.170)
Tiverton	Coefficient	-0.148	-0.086	1.455***	0.485
	Standard Error	871	785	739	903
	P-Value	0.762	0.864	0.001	0.149
	Q-Value	0.057	0.068	0.143	0.071
	Effective Sample	N/A	N/A	0.001	0.275
	Pseudo R2	(0.488)	(0.503)	(0.400)	(0.335)
Univ Of Rhode Island	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Warren	Coefficient	0.275	0.698**	0.293	0.555
	Standard Error	762	717	666	781
	P-Value	0.273	0.016	0.728	0.116
	Q-Value	0.059	0.087	0.109	0.079
	Effective Sample	0.437	0.048	0.820	0.238
	Pseudo R2	(0.250)	(0.289)	(0.847)	(0.354)
Warwick	Coefficient	0.270***	0.402***	-0.264++	0.008
	Standard Error	2611	2525	2590	2877
	P-Value	0.004	0.001	0.012	0.898
	Q-Value	0.048	0.048	0.076	0.059
	Effective Sample	0.018	0.001	N/A	0.929
	Pseudo R2	(0.096)	(0.094)	(0.105)	(0.065)
West Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
West Warwick	Coefficient	-0.519	0.059	-0.280+	-0.065
	Standard Error	1383	1317	1260	1385
	P-Value	0.143	0.865	0.052	0.728
	Q-Value	0.082	0.076	0.067	0.054
	Effective Sample	N/A	0.919	N/A	N/A
	Pseudo R2	(0.356)	(0.352)	(0.143)	(0.190)

Table C.8: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Westerly	Coefficient	-0.216	0.111	0.217	0.093
	Standard Error	1056	945	728	1069
	P-Value	0.441	0.670	0.361	0.707
	Q-Value	0.054	0.059	0.050	0.054
	Effective Sample	N/A	0.787	0.532	0.819
	Pseudo R2	(0.280)	(0.259)	(0.238)	(0.246)
Woonsocket	Coefficient	0.395***	0.291	-0.043	0.079
	Standard Error	1751	1226	1340	1470
	P-Value	0.001	0.153	0.769	0.550
	Q-Value	0.101	0.057	0.052	0.041
	Effective Sample	0.008	0.279	N/A	0.675
	Pseudo R2	(0.122)	(0.203)	(0.145)	(0.131)

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	0.079	0.128	1.876***	1.008++
	Standard Error	588	508	571	612
	P-Value	0.837	0.790	0.006	0.017
	Q-Value	0.059	0.057	0.112	0.059
	Effective Sample	0.925	0.907	0.071	0.115
	Pseudo R2	(0.388)	(0.486)	(0.679)	(0.423)
Bristol	Coefficient	0.119	-0.004	-0.115	-0.114
	Standard Error	1171	1108	1109	1386
	P-Value	0.726	0.989	0.833	0.716
	Q-Value	0.050	0.068	0.052	0.048
	Effective Sample	0.880	N/A	N/A	N/A
	Pseudo R2	(0.340)	(0.367)	(0.547)	(0.312)
Burrillville	Coefficient	0.128	0.379	0.751	0.465
	Standard Error	635	526	548	683
	P-Value	0.768	0.455	0.172	0.273
	Q-Value	0.050	0.059	0.096	0.056
	Effective Sample	0.902	0.716	0.453	0.578
	Pseudo R2	(0.439)	(0.509)	(0.550)	(0.425)
Central Falls	Coefficient	0.181	0.189	-0.081	-0.046
	Standard Error	544	536	857	1010
	P-Value	0.501	0.488	0.689	0.808
	Q-Value	0.034	0.028	0.026	0.021
	Effective Sample	0.742	0.739	N/A	N/A
	Pseudo R2	(0.270)	(0.275)	(0.202)	(0.187)
Charlestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Coventry	Coefficient	-0.032	1.167	N/A	0.661
	Standard Error	838	682	N/A	884
	P-Value	0.948	0.112	N/A	0.293
	Q-Value	0.041	0.072	N/A	0.071
	Effective Sample	N/A	0.358	N/A	0.598
	Pseudo R2	(0.512)	(0.734)	N/A	(0.628)
Cranston	Coefficient	0.204++	0.188+	0.342***	0.259***
	Standard Error	3531	3345	3471	4138
	P-Value	0.024	0.052	0.001	0.001
	Q-Value	0.010	0.013	0.014	0.010
	Effective Sample	0.150	0.216	0.001	0.026
	Pseudo R2	(0.090)	(0.097)	(0.093)	(0.079)

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Cumberland	Coefficient	1.008++	1.649***	-0.126	0.372
	Standard Error	620	595	622	677
	P-Value	0.013	0.003	0.749	0.259
	Q-Value	0.068	0.093	0.072	0.046
	Effective Sample	0.108	0.043	N/A	0.578
	Pseudo R2	(0.407)	(0.555)	(0.391)	(0.330)
DEM	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Providence	Coefficient	-0.375++	-0.127	0.087	-0.064
	Standard Error	1706	1636	1485	1757
	P-Value	0.017	0.465	0.702	0.675
	Q-Value	0.034	0.028	0.028	0.020
	Effective Sample	N/A	N/A	0.865	N/A
	Pseudo R2	(0.158)	(0.173)	(0.231)	(0.152)
Foster	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Glocester	Coefficient	-1.144++	-1.901+++	0.142	-0.779+
	Standard Error	611	530	564	586
	P-Value	0.028	0.004	0.809	0.075
	Q-Value	0.128	0.148	0.076	0.068
	Effective Sample	N/A	N/A	0.907	N/A
	Pseudo R2	(0.522)	(0.652)	(0.586)	(0.437)
Hopkinton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Jamestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Johnston	Coefficient	-0.356	-0.398	0.156	-0.008
	Standard Error	860	839	872	960
	P-Value	0.312	0.266	0.611	0.975
	Q-Value	0.052	0.061	0.076	0.067
	Effective Sample	N/A	N/A	0.808	N/A
	Pseudo R2	(0.352)	(0.358)	(0.307)	(0.261)
Lincoln	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Little Compton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Middletown	Coefficient	0.898	0.711	N/A	0.477
	Standard Error	532	521	N/A	551
	P-Value	0.134	0.254	N/A	0.273
	Q-Value	0.068	0.079	N/A	0.048
	Effective Sample	0.379	0.578	N/A	0.578
	Pseudo R2	(0.598)	(0.623)	N/A	(0.435)
Narragansett	Coefficient	-0.760++	-0.938++	0.289	-0.344
	Standard Error	1116	1077	1030	1121
	P-Value	0.048	0.029	0.453	0.246
	Q-Value	0.041	0.050	0.067	0.037
	Effective Sample	N/A	N/A	0.716	N/A
	Pseudo R2	(0.384)	(0.432)	(0.386)	(0.298)
Newport	Coefficient	0.034	-0.160	-0.252	-0.210
	Standard Error	1007	966	898	1043
	P-Value	0.862	0.479	0.405	0.277
	Q-Value	0.013	0.024	0.046	0.020
	Effective Sample	0.930	N/A	N/A	N/A
	Pseudo R2	(0.199)	(0.228)	(0.303)	(0.194)

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
North Kingstown	Coefficient	-2.160+++	-0.352	N/A	-0.437
	Standard Error	701	524	N/A	649
	P-Value	0.001	0.629	N/A	0.425
	Q-Value	0.158	0.057	N/A	0.072
	Effective Sample	0.001	N/A	N/A	N/A
	Pseudo R2	(0.423)	(0.730)	N/A	(0.550)
North Providence	Coefficient	0.190	0.114	0.455	0.252
	Standard Error	565	543	534	623
	P-Value	0.470	0.695	0.168	0.301
	Q-Value	0.061	0.074	0.082	0.063
	Effective Sample	0.725	0.865	0.453	0.598
	Pseudo R2	(0.264)	(0.293)	(0.330)	(0.246)
North Smithfield	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Pawtucket	Coefficient	0.291++	0.333++	0.328++	0.312++
	Standard Error	1592	1548	1529	1910
	P-Value	0.048	0.029	0.034	0.014
	Q-Value	0.026	0.028	0.013	0.017
	Effective Sample	0.209	0.165	0.165	0.108
	Pseudo R2	(0.148)	(0.153)	(0.155)	(0.128)
Portsmouth	Coefficient	0.134	0.107	0.405	0.241
	Standard Error	938	923	768	957
	P-Value	0.672	0.755	0.326	0.391
	Q-Value	0.050	0.045	0.071	0.041
	Effective Sample	0.865	0.902	0.605	0.662
	Pseudo R2	(0.316)	(0.344)	(0.412)	(0.282)
Providence	Coefficient	0.206+	0.250++	0.063	0.082
	Standard Error	2128	2049	2136	2869
	P-Value	0.076	0.035	0.589	0.418
	Q-Value	0.016	0.017	0.013	0.013
	Effective Sample	0.294	0.165	0.794	0.688
	Pseudo R2	(0.115)	(0.119)	(0.115)	(0.101)
Richmond	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
RISP - Chepachet	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
RISP - Hope Valley	Coefficient	0.657++	1.057***	0.138	0.657++
	Standard Error	626	567	530	637
	P-Value	0.010	0.001	0.694	0.013
	Q-Value	0.039	0.054	0.039	0.039
	Effective Sample	0.108	0.026	0.865	0.108
	Pseudo R2	(0.259)	(0.323)	(0.352)	(0.264)
RISP - HQ	Coefficient	0.384+	0.474+	0.032	0.193
	Standard Error	764	630	618	772
	P-Value	0.083	0.083	0.902	0.393
	Q-Value	0.056	0.056	0.032	0.032
	Effective Sample	0.294	0.294	0.944	0.662
	Pseudo R2	(0.223)	(0.275)	(0.272)	(0.225)
RISP - Lincoln	Coefficient	-0.076	0.054	0.218	0.006
	Standard Error	592	562	514	622
	P-Value	0.794	0.866	0.558	0.982
	Q-Value	0.030	0.032	0.043	0.030
	Effective Sample	N/A	0.930	0.769	0.982
	Pseudo R2	(0.296)	(0.324)	(0.374)	(0.273)
RISP - Wickford	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Scituate	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Smithfield	Coefficient	0.293	0.224	0.034	0.119
	Standard Error	963	914	899	1021
	P-Value	0.216	0.384	0.906	0.561
	Q-Value	0.039	0.035	0.045	0.028
	Effective Sample	0.550	0.662	0.944	0.769
	Pseudo R2	(0.237)	(0.259)	(0.286)	(0.207)

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
South Kingstown	Coefficient	-0.010	0.587+	0.451	0.630++
	Standard Error	1002	972	827	1003
	P-Value	0.970	0.087	0.358	0.034
	Q-Value	0.026	0.043	0.054	0.035
	Effective Sample	N/A	0.294	0.646	0.165
	Pseudo R2	(0.282)	(0.344)	(0.490)	(0.296)
Tiverton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Univ Of Rhode Island	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Warren	Coefficient	0.430	0.824	N/A	0.656
	Standard Error	562	507	N/A	554
	P-Value	0.316	0.123	N/A	0.123
	Q-Value	0.046	0.054	N/A	0.046
	Effective Sample	0.598	0.368	N/A	0.368
	Pseudo R2	(0.428)	(0.537)	N/A	(0.425)
Warwick	Coefficient	0.186	0.232	-0.137	0.037
	Standard Error	1790	1761	1764	1918
	P-Value	0.310	0.239	0.472	0.808
	Q-Value	0.024	0.024	0.026	0.021
	Effective Sample	0.598	0.573	N/A	0.907
	Pseudo R2	(0.184)	(0.199)	(0.193)	(0.150)
West Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
West Warwick	Coefficient	-0.629+++	0.367	-0.068	0.150
	Standard Error	1005	897	879	987
	P-Value	0.008	0.224	0.841	0.537
	Q-Value	0.067	0.070	0.063	0.054
	Effective Sample	N/A	0.552	N/A	0.763
	Pseudo R2	(0.238)	(0.301)	(0.342)	(0.241)

Table C.9: Logistic Regression of Minority Status on Daylight by Department, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Westerly	Coefficient	-0.204	0.025	N/A	0.013
	Standard Error	842	785	N/A	800
	P-Value	0.513	0.950	N/A	0.968
	Q-Value	0.059	0.054	N/A	0.054
	Effective Sample	N/A	0.977	N/A	0.982
	Pseudo R2	(0.312)	(0.402)	N/A	(0.349)
Woonsocket	Coefficient	0.453***	0.199	-0.143	-0.054
	Standard Error	1400	862	934	1015
	P-Value	0.003	0.527	0.544	0.787
	Q-Value	0.043	0.052	0.048	0.035
	Effective Sample	0.043	0.763	N/A	N/A
	Pseudo R2	(0.150)	(0.314)	(0.237)	(0.202)

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	-0.075	N/A	1.794***	0.870+
	Standard Error	532	N/A	533	595
	P-Value	0.861	N/A	0.001	0.056
	Q-Value	0.108	N/A	0.122	0.093
	Effective Sample	N/A	N/A	0.001	0.145
	Pseudo R2	(0.435)	N/A	(0.430)	(0.455)
Bristol	Coefficient	0.175	-0.024	-0.140	-0.155
	Standard Error	1052	995	888	1356
	P-Value	0.555	0.949	0.737	0.630
	Q-Value	0.096	0.098	0.079	0.075
	Effective Sample	0.708	N/A	N/A	N/A
	Pseudo R2	(0.298)	(0.377)	(0.418)	(0.321)
Burrillville	Coefficient	0.177	0.542	N/A	0.523
	Standard Error	635	509	N/A	661
	P-Value	0.644	0.236	N/A	0.270
	Q-Value	0.063	0.094	N/A	0.079
	Effective Sample	0.768	0.416	N/A	0.456
	Pseudo R2	(0.382)	(0.458)	N/A	(0.474)
Central Falls	Coefficient	0.372	0.381	0.017	0.030
	Standard Error	537	529	851	1004
	P-Value	0.308	0.314	0.938	0.888
	Q-Value	0.065	0.059	0.043	0.039
	Effective Sample	0.469	0.469	0.962	0.925
	Pseudo R2	(0.367)	(0.379)	(0.210)	(0.224)
Charlestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Coventry	Coefficient	0.068	1.723***	N/A	0.902**
	Standard Error	728	529	N/A	749
	P-Value	0.888	0.008	N/A	0.018
	Q-Value	0.079	0.127	N/A	0.090
	Effective Sample	0.925	0.034	N/A	0.064
	Pseudo R2	(0.486)	(0.657)	N/A	(0.384)
Cranston	Coefficient	0.211**	0.186	0.379***	0.282***
	Standard Error	3479	3272	3441	4121
	P-Value	0.024	0.112	0.001	0.002
	Q-Value	0.064	0.076	0.067	0.067
	Effective Sample	0.076	0.238	0.001	0.010
	Pseudo R2	(0.093)	(0.116)	(0.086)	(0.090)

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Cumberland	Coefficient	1.001**	1.574***	-0.007	0.402***
	Standard Error	606	575	539	663
	P-Value	0.028	0.001	0.953	0.001
	Q-Value	0.090	0.115	0.100	0.064
	Effective Sample	0.089	0.001	N/A	0.001
	Pseudo R2	(0.460)	(0.231)	(0.123)	(0.112)
DEM	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
East Providence	Coefficient	-0.219	0.048	0.210	0.082
	Standard Error	1700	1630	1449	1750
	P-Value	0.108	0.646	0.186	0.398
	Q-Value	0.068	0.063	0.061	0.046
	Effective Sample	N/A	0.768	0.352	0.561
	Pseudo R2	(0.136)	(0.105)	(0.159)	(0.097)
Foster	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Glocester	Coefficient	-1.110	-1.950++	0.398	-0.635
	Standard Error	594	513	547	569
	P-Value	0.101	0.017	0.412	0.280
	Q-Value	0.135	0.152	0.135	0.097
	Effective Sample	N/A	N/A	0.570	N/A
	Pseudo R2	(0.677)	(0.815)	(0.486)	(0.589)
Hopkinton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Jamestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Johnston	Coefficient	-0.460+++	-0.513+++	0.159	-0.071
	Standard Error	829	808	851	951
	P-Value	0.006	0.003	0.174	0.421
	Q-Value	0.075	0.090	0.109	0.097
	Effective Sample	N/A	N/A	0.342	N/A
	Pseudo R2	(0.167)	(0.172)	(0.118)	(0.087)
Lincoln	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Little Compton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Middletown	Coefficient	1.029	N/A	N/A	0.578
	Standard Error	505	N/A	N/A	521
	P-Value	0.109	N/A	N/A	0.115
	Q-Value	0.104	N/A	N/A	0.074
	Effective Sample	0.238	N/A	N/A	0.238
	Pseudo R2	(0.643)	N/A	N/A	(0.368)
Narragansett	Coefficient	-0.810+	-0.954+	0.409	-0.344
	Standard Error	1040	1004	909	1077
	P-Value	0.054	0.081	0.321	0.393
	Q-Value	0.061	0.079	0.104	0.064
	Effective Sample	N/A	N/A	0.469	N/A
	Pseudo R2	(0.421)	(0.547)	(0.412)	(0.402)
Newport	Coefficient	0.039	-0.165	-0.317	-0.240++
	Standard Error	961	911	794	988
	P-Value	0.767	0.314	0.179	0.014
	Q-Value	0.043	0.063	0.064	0.048
	Effective Sample	0.832	N/A	N/A	N/A
	Pseudo R2	(0.133)	(0.165)	(0.237)	(0.098)

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
North Kingstown	Coefficient	-2.030+++	N/A	N/A	-0.272
	Standard Error	686	N/A	N/A	618
	P-Value	0.001	N/A	N/A	0.639
	Q-Value	0.186	N/A	N/A	0.101
	Effective Sample	0.001	N/A	N/A	N/A
	Pseudo R2	(0.412)	N/A	N/A	(0.582)
North Providence	Coefficient	0.409***	0.303+	0.800***	0.483***
	Standard Error	558	533	516	616
	P-Value	0.003	0.082	0.001	0.001
	Q-Value	0.096	0.104	0.122	0.093
	Effective Sample	0.014	0.189	0.001	0.001
	Pseudo R2	(0.136)	(0.173)	(0.174)	(0.133)
North Smithfield	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Pawtucket	Coefficient	0.280***	0.317***	0.254***	0.263***
	Standard Error	1588	1544	1528	1907
	P-Value	0.006	0.003	0.004	0.002
	Q-Value	0.072	0.078	0.057	0.064
	Effective Sample	0.025	0.017	0.024	0.010
	Pseudo R2	(0.101)	(0.108)	(0.090)	(0.085)
Portsmouth	Coefficient	0.111	0.104	0.574***	0.252
	Standard Error	917	902	658	936
	P-Value	0.677	0.731	0.008	0.284
	Q-Value	0.068	0.068	0.089	0.059
	Effective Sample	0.768	0.805	0.032	0.458
	Pseudo R2	(0.268)	(0.305)	(0.215)	(0.234)
Providence	Coefficient	0.204***	0.248***	0.063+	0.082***
	Standard Error	2128	2049	2136	2869
	P-Value	0.001	0.001	0.064	0.001
	Q-Value	0.016	0.017	0.013	0.013
	Effective Sample	0.008	0.008	0.164	0.001
	Pseudo R2	(0.006)	(0.006)	(0.034)	(0.017)
Richmond	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
RISP - Chepachet	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
RISP - Hope Valley	Coefficient	0.799***	1.189**	0.277	0.725+
	Standard Error	615	515	517	635
	P-Value	0.002	0.010	0.574	0.054
	Q-Value	0.115	0.116	0.100	0.096
	Effective Sample	0.010	0.037	0.716	0.145
	Pseudo R2	(0.257)	(0.465)	(0.495)	(0.375)
RISP - HQ	Coefficient	0.340+	0.483+	0.136	0.256
	Standard Error	753	612	599	766
	P-Value	0.050	0.085	0.697	0.189
	Q-Value	0.104	0.076	0.064	0.059
	Effective Sample	0.145	0.189	0.778	0.352
	Pseudo R2	(0.174)	(0.280)	(0.349)	(0.195)
RISP - Lincoln	Coefficient	0.182	0.331	N/A	0.115
	Standard Error	564	525	N/A	617
	P-Value	0.280	0.208	N/A	0.547
	Q-Value	0.071	0.076	N/A	0.074
	Effective Sample	0.458	0.375	N/A	0.708
	Pseudo R2	(0.168)	(0.263)	N/A	(0.192)
RISP - Wickford	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Scituate	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Smithfield	Coefficient	0.264	0.179	0.016	0.108
	Standard Error	923	857	848	981
	P-Value	0.319	0.560	0.958	0.657
	Q-Value	0.059	0.057	0.074	0.045
	Effective Sample	0.469	0.708	0.970	0.768
	Pseudo R2	(0.266)	(0.307)	(0.301)	(0.246)

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
South Kingstown	Coefficient	0.002	0.574+	0.449	0.633+
	Standard Error	988	949	685	980
	P-Value	0.991	0.070	0.331	0.054
	Q-Value	0.052	0.072	0.068	0.061
	Effective Sample	0.991	0.172	0.474	0.145
	Pseudo R2	(0.199)	(0.317)	(0.462)	(0.331)
Tiverton	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Univ Of Rhode Island	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
Warren	Coefficient	0.439	N/A	N/A	0.745**
	Standard Error	540	N/A	N/A	531
	P-Value	0.119	N/A	N/A	0.023
	Q-Value	0.068	N/A	N/A	0.104
	Effective Sample	0.238	N/A	N/A	0.075
	Pseudo R2	(0.282)	N/A	N/A	(0.326)
Warwick	Coefficient	0.238+	0.289***	-0.109	0.059
	Standard Error	1726	1693	1713	1889
	P-Value	0.083	0.008	0.569	0.647
	Q-Value	0.075	0.071	0.096	0.079
	Effective Sample	0.189	0.034	N/A	0.768
	Pseudo R2	(0.137)	(0.111)	(0.193)	(0.129)
West Greenwich	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
West Warwick	Coefficient	-0.501	0.268	0.032	0.148
	Standard Error	1000	884	811	974
	P-Value	0.245	0.252	0.810	0.296
	Q-Value	0.114	0.079	0.074	0.064
	Effective Sample	N/A	0.437	0.866	0.467
	Pseudo R2	(0.432)	(0.234)	(0.136)	(0.141)

Table C.10: Logistic Regression of Minority Status on Daylight by Department with Officer Fixed-Effects, All Moving Violations 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Westerly	Coefficient	-0.164	0.134	N/A	0.098
	Standard Error	723	593	N/A	688
	P-Value	0.407	0.428	N/A	0.672
	Q-Value	0.082	0.076	N/A	0.067
	Effective Sample	N/A	0.580	N/A	0.768
	Pseudo R2	(0.197)	(0.168)	N/A	(0.232)
Woonsocket	Coefficient	0.476***	0.188	-0.141	-0.039
	Standard Error	1353	849	925	1006
	P-Value	0.001	0.523	0.351	0.847
	Q-Value	0.146	0.083	0.078	0.061
	Effective Sample	0.001	0.699	N/A	N/A
	Pseudo R2	(0.125)	(0.296)	(0.150)	(0.200)

APPENDIX D

Table D.1: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	175649	175649	175649	175649
Bristol	Coefficient	-0.763+++	-0.625+++	-0.649+++	-0.634+++
	Standard Error	(0.059)	(0.068)	(0.075)	(0.052)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	193785	193785	193785	193785
Burrillville	Coefficient	-0.481+++	-0.254+++	-0.163+	2.198***
	Standard Error	(0.082)	(0.087)	(0.089)	(0.061)
	P-Value	0.001	0.004	0.065	0.001
	Q-Value	0.001	N/A	N/A	0.004
	Effective Sample	103726	103726	103726	103726
Central Falls	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	32524	32524	32524	32524
Charlestown	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	57987	57987	57987	57987
Coventry	Coefficient	-1.641+++	-1.766+++	-1.659+++	-1.828+++
	Standard Error	(0.059)	(0.067)	(0.072)	(0.052)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	188975	188975	188975	188975
Cranston	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	54850	54850	54850	54850
Cumberland	Coefficient	-0.166+++	-0.037	0.308***	0.180***
	Standard Error	(0.046)	(0.052)	(0.045)	(0.037)
	P-Value	0.001	0.460	0.001	0.001
	Q-Value	0.001	N/A	0.001	0.001
	Effective Sample	214700	214700	214700	214700
East Greenwich	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	45486	45486	45486	45486

Table D.1: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
East Providence	Coefficient	1.261***	1.302***	0.620***	1.090***
	Standard Error	(0.054)	(0.059)	(0.063)	(0.046)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.004	0.004	0.004	0.004
	Effective Sample	186738	186738	186738	186738
Foster	Coefficient	0.638***	0.479***	0.767***	0.714***
	Standard Error	(0.089)	(0.104)	(0.112)	(0.081)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.001	0.004
	Effective Sample	63471	63471	63471	63471
Glocester	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	58424	58424	58424	58424
Hopkinton	Coefficient	-0.028	N/A	-0.609+++	-0.430+++
	Standard Error	(0.074)	(0.082)	(0.098)	(0.070)
	P-Value	0.700	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.001	0.001
	Effective Sample	103131	103131	103131	103131
Jamestown	Coefficient	1.490***	N/A	-0.282++	-1.379+++
	Standard Error	(0.101)	(0.123)	(0.128)	(0.093)
	P-Value	0.001	0.001	0.028	0.001
	Q-Value	0.004	N/A	N/A	N/A
	Effective Sample	81430	81430	81430	81430
Johnston	Coefficient	6.532+++	N/A	0.488***	0.165***
	Standard Error	(0.041)	(0.045)	(0.043)	(0.035)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.004	0.001
	Effective Sample	193785	193785	193785	193785
Lincoln	Coefficient	0.342***	0.330***	1.118***	0.786***
	Standard Error	(0.068)	(0.075)	(0.064)	(0.054)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.004	0.004
	Effective Sample	214700	214700	214700	214700
Little Compton	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	50896	50896	50896	50896
Middletown	Coefficient	0.008	0.425***	N/A	0.096**
	Standard Error	(0.043)	(0.046)	(0.054)	(0.039)
	P-Value	0.862	0.001	0.001	0.013
	Q-Value	1.000	0.004	N/A	0.043
	Effective Sample	214700	214700	214700	214700

Table D.1: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Narragansett	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	59778	59778	59778	59778
Newport	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	66665	66665	66665	66665
North Kingstown	Coefficient	0.123**	-0.361+++	-0.421+++	-0.337+++
	Standard Error	(0.048)	(0.061)	(0.064)	(0.046)
	P-Value	0.012	0.001	0.001	0.001
	Q-Value	0.039	0.001	0.001	0.001
	Effective Sample	214700	214700	214700	214700
North Providence	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	76097	76097	76097	76097
North Smithfield	Coefficient	1.179***	1.238***	1.657***	1.565***
	Standard Error	(0.104)	(0.127)	(0.135)	(0.098)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.004	0.004	0.004	0.004
	Effective Sample	199360	199360	199360	199360
Pawtucket	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	88073	88073	88073	88073
Portsmouth	Coefficient	0.166***	0.310***	-0.273+++	0.101**
	Standard Error	(0.050)	(0.054)	(0.063)	(0.043)
	P-Value	0.001	0.001	0.001	0.017
	Q-Value	0.001	0.001	0.001	0.056
	Effective Sample	199360	199360	199360	199360
Providence	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	15340	15340	15340	15340
Richmond	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	57414	57414	57414	57414

Table D.1: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Scituate	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	54705	54705	54705	54705
Smithfield	Coefficient	3.900+++	N/A	-0.317+++	-0.261+++
	Standard Error	(0.046)	(0.050)	(0.059)	(0.043)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.001	0.001
	Effective Sample	115421	115421	115421	115421
South Kingstown	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	5575	5575	5575	5575
Tiverton	Coefficient	3.803+++	1.067***	1.241***	0.028
	Standard Error	(0.057)	(0.064)	(0.067)	(0.070)
	P-Value	0.001	0.001	0.001	0.689
	Q-Value	N/A	0.004	0.004	1.000
	Effective Sample	138008	138008	138008	138008
Warren	Coefficient	0.024	-0.202+++	0.216**	-0.596+++
	Standard Error	(0.064)	(0.078)	(0.090)	(0.063)
	P-Value	0.713	0.008	0.017	0.001
	Q-Value	1.000	N/A	0.056	N/A
	Effective Sample	140035	140035	140035	140035
Warwick	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	88451	88451	88451	88451
West Greenwich	Coefficient	-1.129+++	-1.264+++	-1.664+++	-1.544+++
	Standard Error	(0.175)	(0.203)	(0.238)	(0.165)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.001	N/A
	Effective Sample	87192	87192	87192	87192
West Warwick	Coefficient	-0.563+++	-1.003+++	0.660***	-1.078+++
	Standard Error	(0.045)	(0.063)	(0.061)	(0.054)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	N/A	N/A	0.004	N/A
	Effective Sample	128620	128620	128620	128620
Westerly	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	52067	52067	52067	52067

Table D.1: Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Woonsocket	Coefficient	1.263***	-0.071	-0.296+++	-0.218+++
	Standard Error	(0.079)	(0.076)	(0.074)	(0.063)
	P-Value	0.001	0.347	0.001	0.001
	Q-Value	0.004	N/A	0.001	0.001
	Effective Sample	214700	214700	214700	214700

Table D.2: Doubly-Robust Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	175649	175649	175649	175649
Bristol	Coefficient	1.279	-1.003+++	-0.300+++	-0.160++
	Standard Error	(0.001)	(0.105)	(0.097)	(0.072)
	P-Value	N/A	0.001	0.002	0.027
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	193785	193785	193785	193785
Burrillville	Coefficient	-1.164	-0.757	-0.337	-0.316+++
	Standard Error	(0.001)	(0.001)	(0.001)	(0.057)
	P-Value	N/A	N/A	N/A	0.001
	Q-Value	N/A	N/A	N/A	0.001
	Effective Sample	103726	103726	103726	103726
Central Falls	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	104683	104683	104683	104683
Charlestown	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	57987	57987	57987	57987
Coventry	Coefficient	0.680**	N/A	N/A	2.822
	Standard Error	(0.291)	(0.001)	(0.001)	(0.001)
	P-Value	0.019	N/A	N/A	N/A
	Q-Value	0.064	N/A	N/A	N/A
	Effective Sample	188975	188975	188975	188975
Cranston	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	54850	54850	54850	54850
Cumberland	Coefficient	0.160***	0.293***	0.815***	0.597***
	Standard Error	(0.052)	(0.056)	(0.048)	(0.039)
	P-Value	0.002	0.001	0.001	0.001
	Q-Value	0.008	0.001	0.004	0.004
	Effective Sample	214700	214700	214700	214700
East Greenwich	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	45486	45486	45486	45486

Table D.2: Doubly-Robust Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
East Providence	Coefficient	0.194	0.462	-1.444+++	-6.623
	Standard Error	(0.439)	(0.001)	(0.093)	(0.001)
	P-Value	0.658	N/A	0.001	N/A
	Q-Value	1.000	N/A	N/A	N/A
	Effective Sample	186738	186738	186738	186738
Foster	Coefficient	N/A	1.817***	1.889***	4.928+++
	Standard Error	N/A	(0.338)	(0.381)	(0.180)
	P-Value	0.791	0.001	0.001	0.001
	Q-Value	N/A	0.001	0.001	N/A
	Effective Sample	63471	63471	63471	63471
Glocester	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	58424	58424	58424	58424
Hopkinton	Coefficient	N/A	2.974***	N/A	2.940***
	Standard Error	(2.302)	(0.407)	(0.001)	(0.714)
	P-Value	0.001	0.001	N/A	0.001
	Q-Value	0.001	0.001	N/A	0.001
	Effective Sample	103131	103131	103131	103131
Jamestown	Coefficient	N/A	N/A	N/A	N/A
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	81430	81430	81430	81430
Johnston	Coefficient	0.230	0.228	0.423***	0.538***
	Standard Error	(0.180)	(0.196)	(0.157)	(0.133)
	P-Value	0.201	0.246	0.007	0.001
	Q-Value	0.621	0.741	0.023	0.001
	Effective Sample	193785	193785	193785	193785
Lincoln	Coefficient	0.492***	0.515***	1.254***	0.953***
	Standard Error	(0.071)	(0.079)	(0.070)	(0.057)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.001	0.004	0.004
	Effective Sample	214700	214700	214700	214700
Little Compton	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	50896	50896	50896	50896
Middletown	Coefficient	0.289***	0.615***	1.462***	0.395***
	Standard Error	(0.048)	(0.050)	(0.179)	(0.041)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.001	0.004	0.001	0.004
	Effective Sample	214700	214700	214700	214700

Table D.2: Doubly-Robust Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Narragansett	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	49019	49019	49019	49019
Newport	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	6631	6631	6631	6631
North Kingstown	Coefficient	4.363+++	-0.078	0.583	-0.016
	Standard Error	(0.298)	(0.070)	(0.615)	(0.054)
	P-Value	0.001	0.266	0.342	0.763
	Q-Value	N/A	N/A	1.000	N/A
	Effective Sample	214700	214700	214700	214700
North Providence	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	76097	76097	76097	76097
North Smithfield	Coefficient	1.174***	1.245***	1.730***	1.598***
	Standard Error	(0.112)	(0.134)	(0.137)	(0.101)
	P-Value	0.001	0.001	0.001	0.001
	Q-Value	0.004	0.004	0.004	0.004
	Effective Sample	199360	199360	199360	199360
Pawtucket	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	88073	88073	88073	88073
Portsmouth	Coefficient	0.277***	0.437***	N/A	0.246***
	Standard Error	(0.057)	(0.061)	(0.001)	(0.048)
	P-Value	0.001	0.001	N/A	0.001
	Q-Value	0.001	0.001	N/A	0.001
	Effective Sample	199360	199360	199360	199360
Providence	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	15340	15340	15340	15340
Richmond	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	57414	57414	57414	57414

Table D.2: Doubly-Robust Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Scituate	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	54705	54705	54705	54705
Smithfield	Coefficient	1.616***	1.983***	4.138	1.070***
	Standard Error	(0.065)	(0.074)	(0.001)	(0.212)
	P-Value	0.001	0.001	N/A	0.001
	Q-Value	0.004	0.004	N/A	0.001
	Effective Sample	115421	115421	115421	115421
South Kingstown	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	59216	59216	59216	59216
Tiverton	Coefficient	N/A	-0.360	-0.063	-0.007
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	138008	138008	138008	138008
Warren	Coefficient	2.198	1.332	-0.293	3.842
	Standard Error	(0.001)	(0.001)	(1.228)	(0.001)
	P-Value	N/A	N/A	0.811	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	140035	140035	140035	140035
Warwick	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	88451	88451	88451	88451
West Greenwich	Coefficient	N/A	N/A	N/A	-0.746+++
	Standard Error	(0.001)	(0.001)	(0.001)	(0.182)
	P-Value	N/A	N/A	N/A	0.001
	Q-Value	N/A	N/A	N/A	0.001
	Effective Sample	87192	87192	87192	87192
West Warwick	Coefficient	-0.731	-1.726	-0.957	-1.031
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Effective Sample	128620	128620	128620	128620
Westerly	Coefficient	0.001	0.001	0.001	0.001
	Standard Error	(0.001)	(0.001)	(0.001)	(0.001)
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	1.000	1.000	1.000	1.000
	Effective Sample	52067	52067	52067	52067

Table D.2: Doubly-Robust Inverse Propensity Score Weighted Logistic Regression of Minority Status on Department, All Traffic Stops 2017

Department	Variable	Non-Caucasian	Black	Hispanic	Black or Hispanic
Woonsocket	Coefficient	1.394***	0.907***	0.694***	0.231++
	Standard Error	(0.143)	(0.310)	(0.114)	(0.116)
	P-Value	0.001	0.003	0.001	0.046
	Q-Value	0.004	0.012	0.001	0.150
	Effective Sample	214700	214700	214700	214700

APPENDIX E

Table E.1: Statewide Average Comparisons for Black Motorists, All Departments

Department Name	Black Stops	Difference Between Town and State Average	Black Residents Age 16+	Difference Between Town and State Average	Difference Between Net Differences
Barrington	6.7%	-5.5%	0.00%	-4.5%	-1.0%
Bristol	3.8%	-8.4%	0.70%	-3.8%	-4.6%
Burrillville	3.0%	-9.2%	0.00%	-4.5%	-4.7%
Central Falls	17.3%	5.1%	6.80%	2.3%	2.8%
Charlestown	4.9%	-7.3%	0.00%	-4.5%	-2.8%
Coventry	2.8%	-9.4%	0.50%	-4.0%	-5.4%
Cranston	14.5%	2.3%	4.60%	0.1%	2.2%
Cumberland	7.2%	-5.0%	1.10%	-3.4%	-1.6%
East Greenwich	4.1%	-8.1%	0.80%	-3.7%	-4.4%
East Providence	17.6%	5.4%	5.20%	0.7%	4.7%
Foster	7.1%	-5.1%	0.00%	-4.5%	-0.6%
Glocester	3.5%	-8.7%	0.00%	-4.5%	-4.2%
Hopkinton	6.0%	-6.2%	0.00%	-4.5%	-1.7%
Jamestown	4.6%	-7.6%	0.00%	-4.5%	-3.1%
Johnston	8.9%	-3.3%	1.60%	-2.9%	-0.4%
Lincoln	8.6%	-3.6%	1.30%	-3.2%	-0.4%
Little Compton	1.9%	-10.3%	0.00%	-4.5%	-5.8%
Middletown	11.2%	-1.0%	4.20%	-0.3%	-0.7%
Narragansett	5.7%	-6.5%	0.70%	-3.8%	-2.7%
Newport	12.1%	-0.1%	6.10%	1.6%	-1.7%
North Kingstown	6.7%	-5.5%	0.80%	-3.7%	-1.8%
North Providence	16.7%	4.5%	3.90%	-0.6%	5.1%
North Smithfield	12.9%	0.7%	0.00%	-4.5%	5.2%
Pawtucket	20.4%	8.2%	11.10%	6.6%	1.6%
Portsmouth	8.7%	-3.5%	1.30%	-3.2%	-0.3%
Providence	28.4%	16.2%	12.40%	7.9%	8.3%
Richmond	5.4%	-6.8%	0.00%	-4.5%	-2.3%
Scituate	3.1%	-9.1%	0.00%	-4.5%	-4.6%
Smithfield	7.3%	-4.9%	1.20%	-3.3%	-1.6%
South Kingstown	7.2%	-5.0%	2.10%	-2.4%	-2.6%
Tiverton	5.0%	-7.2%	0.80%	-3.7%	-3.5%
Warren	6.5%	-5.7%	0.90%	-3.6%	-2.1%
Warwick	7.6%	-4.6%	1.40%	-3.1%	-1.5%
West Greenwich	2.3%	-9.9%	0.00%	-4.5%	-5.4%
West Warwick	5.6%	-6.6%	1.90%	-2.6%	-4.0%
Westerly	4.2%	-8.0%	0.80%	-3.7%	-4.3%
Woonsocket	11.3%	-0.9%	4.90%	0.4%	-1.3%

Table E.2: Statewide Average Comparisons for Hispanic Motorists, All Departments

Department Name	Hispanic Stops	Difference Between Town and State Average	Hispanic Residents Age 16+	Difference Between Town and State Average	Difference Between Net Differences
Barrington	6.6%	-7.9%	1.60%	-8.9%	1.0%
Bristol	3.2%	-11.3%	1.70%	-8.8%	-2.5%
Burrillville	3.6%	-10.9%	1.30%	-9.2%	-1.7%
Central Falls	47.6%	33.1%	57.60%	47.1%	-14.0%
Charlestown	2.5%	-12.0%	1.30%	-9.2%	-2.8%
Coventry	2.8%	-11.7%	1.40%	-9.1%	-2.6%
Cranston	22.7%	8.2%	9.20%	-1.3%	9.5%
Cumberland	11.5%	-3.0%	3.80%	-6.7%	3.7%
East Greenwich	4.1%	-10.4%	1.30%	-9.2%	-1.2%
East Providence	10.3%	-4.2%	3.10%	-7.4%	3.2%
Foster	6.7%	-7.8%	0.00%	-10.5%	2.7%
Glocester	4.2%	-10.3%	1.00%	-9.5%	-0.8%
Hopkinton	5.0%	-9.5%	1.60%	-8.9%	-0.6%
Jamestown	4.5%	-10.0%	0.00%	-10.5%	0.5%
Johnston	14.3%	-0.2%	4.60%	-5.9%	5.7%
Lincoln	16.5%	2.0%	3.30%	-7.2%	9.2%
Little Compton	3.5%	-11.0%	0.00%	-10.5%	-0.5%
Middletown	7.9%	-6.6%	3.90%	-6.6%	0.0%
Narragansett	4.7%	-9.8%	1.40%	-9.1%	-0.7%
Newport	8.1%	-6.4%	6.80%	-3.7%	-2.7%
North Kingstown	6.3%	-8.2%	1.80%	-8.7%	0.5%
North Providence	17.4%	2.9%	6.50%	-4.0%	6.9%
North Smithfield	18.1%	3.6%	1.80%	-8.7%	12.3%
Pawtucket	22.8%	8.3%	17.40%	6.9%	1.4%
Portsmouth	4.9%	-9.6%	1.70%	-8.8%	-0.8%
Providence	40.3%	25.8%	33.50%	23.0%	2.8%
Richmond	2.6%	-11.9%	1.50%	-9.0%	-2.9%
Scituate	3.9%	-10.6%	0.90%	-9.6%	-1.0%
Smithfield	6.9%	-7.6%	2.00%	-8.5%	0.9%
South Kingstown	3.7%	-10.8%	2.70%	-7.8%	-3.0%
Tiverton	4.9%	-9.6%	0.80%	-9.7%	0.1%
Warren	4.5%	-10.0%	1.40%	-9.1%	-0.9%
Warwick	7.8%	-6.7%	2.80%	-7.7%	1.0%
West Greenwich	2.0%	-12.5%	1.80%	-8.7%	-3.8%
West Warwick	5.8%	-8.7%	3.80%	-6.7%	-2.0%
Westerly	3.0%	-11.5%	2.20%	-8.3%	-3.2%
Woonsocket	18.8%	4.3%	10.70%	0.2%	4.1%

Table E.3: Statewide Average Comparisons for Minority Motorists, All Departments

Department Name	Minority Stops	Difference Between Town and State Average	Minority Residents Age 16+	Difference Between Town and State Average	Difference Between Net Differences
Barrington	15.6%	-13.3%	4.8%	-15.6%	2.3%
Bristol	8.0%	-20.9%	4.2%	-16.2%	-4.7%
Burrillville	7.1%	-21.8%	2.0%	-18.4%	-3.4%
Central Falls	65.5%	36.6%	69.8%	49.4%	-12.8%
Charlestown	10.0%	-18.9%	4.0%	-16.4%	-2.5%
Coventry	6.4%	-22.5%	3.4%	-17.0%	-5.5%
Cranston	41.2%	12.3%	20.3%	-0.1%	12.4%
Cumberland	20.6%	-8.3%	8.3%	-12.1%	3.8%
East Greenwich	10.0%	-18.9%	6.5%	-13.9%	-5.0%
East Providence	29.4%	0.5%	15.6%	-4.8%	5.3%
Foster	17.3%	-11.6%	0.0%	-20.4%	8.8%
Glocester	9.0%	-19.9%	1.0%	-19.4%	-0.5%
Hopkinton	14.3%	-14.6%	2.5%	-17.9%	3.3%
Jamestown	11.8%	-17.1%	0.0%	-20.4%	3.3%
Johnston	25.1%	-3.8%	8.9%	-11.5%	7.7%
Lincoln	27.7%	-1.2%	8.2%	-12.2%	11.0%
Little Compton	6.5%	-22.4%	0.0%	-20.4%	-2.0%
Middletown	20.4%	-8.5%	12.5%	-7.9%	-0.6%
Narragansett	11.9%	-17.0%	4.3%	-16.1%	-0.9%
Newport	21.6%	-7.3%	18.1%	-2.3%	-5.0%
North Kingstown	14.8%	-14.1%	5.5%	-14.9%	0.8%
North Providence	35.1%	6.2%	14.4%	-6.0%	12.2%
North Smithfield	33.7%	4.8%	3.5%	-16.9%	21.7%
Pawtucket	44.3%	15.4%	38.7%	18.3%	-2.9%
Portsmouth	14.7%	-14.2%	5.5%	-14.9%	0.7%
Providence	71.5%	42.6%	56.9%	36.5%	6.1%
Richmond	10.5%	-18.4%	2.7%	-17.7%	-0.7%
Scituate	8.1%	-20.8%	0.9%	-19.5%	-1.3%
Smithfield	15.9%	-13.0%	5.1%	-15.3%	2.3%
South Kingstown	13.5%	-15.4%	10.1%	-10.3%	-5.1%
Tiverton	10.9%	-18.0%	3.2%	-17.2%	-0.8%
Warren	11.9%	-17.0%	3.2%	-17.2%	0.2%
Warwick	17.3%	-11.6%	7.8%	-12.6%	1.0%
West Greenwich	5.3%	-23.6%	1.8%	-18.6%	-5.0%
West Warwick	12.7%	-16.2%	9.2%	-11.2%	-5.0%
Westerly	9.7%	-19.2%	7.0%	-13.4%	-5.8%
Woonsocket	33.6%	4.7%	23.3%	2.9%	1.8%

Table E.4: Ratio of Minority EDP to Minority Stops, All Departments

Department Name	Number of Stops	% Minority Stops	% Minority EDP	Absolute Difference	Ratio
Barrington	1,242	13.0%	6.5%	6.5%	1.99
Bristol	2,402	6.4%	6.6%	-0.2%	0.97
Burrillville	1,239	6.4%	3.9%	2.5%	1.63
Central Falls	1,470	63.3%	62.5%	0.8%	1.01
Charlestown	681	7.8%	4.7%	3.1%	1.66
Coventry	1,895	5.6%	5.0%	0.6%	1.12
Cranston	6,863	38.9%	19.9%	19.0%	1.95
Cumberland	1,831	17.0%	11.6%	5.4%	1.47
East Greenwich	641	9.4%	9.3%	0.1%	1.01
East Providence	3,003	24.3%	16.7%	7.6%	1.46
Foster	271	9.6%	1.0%	8.6%	9.59
Glocester	925	7.4%	2.3%	5.1%	3.20
Hopkinton	653	9.2%	3.4%	5.8%	2.70
Jamestown	342	7.0%	1.9%	5.1%	3.69
Johnston	2,710	23.7%	12.4%	11.3%	1.91
Lincoln	576	23.8%	13.1%	10.7%	1.82
Little Compton	289	6.2%	1.1%	5.1%	5.66
Middletown	1,104	19.8%	12.3%	7.5%	1.61
Narragansett	1,385	9.3%	5.7%	3.6%	1.63
Newport	1,455	19.2%	16.4%	2.8%	1.17
North Kingstown	850	12.4%	9.0%	3.4%	1.37
North Providence	1,881	32.7%	15.8%	16.9%	2.07
North Smithfield	1,066	27.4%	7.4%	20.0%	3.70
Pawtucket	5,294	42.7%	34.6%	8.1%	1.23
Portsmouth	2,034	12.5%	6.9%	5.6%	1.81
Providence	4,340	64.4%	40.3%	24.1%	1.60
Richmond	437	8.9%	4.7%	4.2%	1.90
Scituate	802	5.5%	2.9%	2.6%	1.89
Smithfield	1,994	14.8%	9.9%	4.9%	1.49
South Kingstown	1,520	10.4%	10.4%	0.0%	1.00
Tiverton	1,187	8.8%	4.1%	4.7%	2.16
Warren	1,112	11.3%	5.6%	5.7%	2.02
Warwick	3,484	14.8%	11.4%	3.4%	1.30
West Greenwich	292	5.1%	5.7%	-0.6%	0.90
West Warwick	1,744	11.1%	10.2%	0.9%	1.08
Westerly	1,488	7.8%	7.9%	-0.1%	0.99
Woonsocket	1,669	28.0%	21.4%	6.6%	1.31

Table E.5: Ratio of Black EDP to Black Stops, All Departments

Department Name	Number of Stops	% Black Stops	% Black EDP	Absolute Difference	Ratio
Barrington	1,242	5.1%	0.6%	4.5%	8.61
Bristol	2,402	3.0%	1.4%	1.6%	2.14
Burrillville	1,239	2.9%	0.5%	2.4%	6.23
Central Falls	1,470	16.5%	6.7%	9.8%	2.46
Charlestown	681	3.8%	0.2%	3.6%	15.76
Coventry	1,895	2.4%	0.9%	1.5%	2.63
Cranston	6,863	14.0%	4.5%	9.4%	3.07
Cumberland	1,831	5.2%	2.0%	3.1%	2.54
East Greenwich	641	3.1%	1.7%	1.4%	1.84
East Providence	3,003	14.0%	4.9%	9.1%	2.84
Foster	271	4.8%	0.2%	4.6%	22.62
Glocester	925	2.5%	0.3%	2.2%	7.78
Hopkinton	653	3.1%	0.3%	2.8%	11.50
Jamestown	342	2.0%	0.5%	1.6%	4.18
Johnston	2,710	8.7%	2.5%	6.1%	3.40
Lincoln	576	6.6%	2.7%	3.9%	2.45
Little Compton	289	0.7%	0.3%	0.4%	2.64
Middletown	1,104	10.6%	3.8%	6.8%	2.81
Narragansett	1,385	4.2%	1.1%	3.1%	3.90
Newport	1,455	10.5%	5.3%	5.2%	2.00
North Kingstown	850	4.8%	1.8%	3.1%	2.74
North Providence	1,881	14.9%	4.1%	10.8%	3.63
North Smithfield	1,066	10.0%	1.1%	9.0%	9.34
Pawtucket	5,294	18.7%	9.5%	9.2%	1.96
Portsmouth	2,034	7.0%	1.7%	5.4%	4.22
Providence	4,340	24.7%	8.9%	15.8%	2.77
Richmond	437	3.0%	0.6%	2.4%	5.35
Scituate	802	2.0%	0.4%	1.6%	5.02
Smithfield	1,994	7.2%	2.3%	5.0%	3.19
South Kingstown	1,520	5.1%	2.2%	2.9%	2.29
Tiverton	1,187	4.0%	1.0%	3.1%	4.14
Warren	1,112	6.4%	1.4%	5.0%	4.67
Warwick	3,484	6.4%	2.4%	4.0%	2.69
West Greenwich	292	1.4%	1.0%	0.4%	1.37
West Warwick	1,744	4.9%	2.1%	2.7%	2.29
Westerly	1,488	3.7%	1.1%	2.5%	3.22
Woonsocket	1,669	8.2%	4.5%	3.7%	1.81

Table E.6: Ratio of Hispanic EDP to Hispanic Stops, All Departments

Department Name	Number of Stops	% Hispanic Stops	% Hispanic EDP	Absolute Difference	Ratio
Barrington	1,242	5.6%	2.5%	3.1%	2.26
Bristol	2,402	2.5%	2.8%	-0.3%	0.90
Burrillville	1,239	3.1%	2.2%	0.9%	1.43
Central Falls	1,470	46.5%	50.3%	-3.8%	0.92
Charlestown	681	2.8%	1.7%	1.1%	1.69
Coventry	1,895	2.4%	2.2%	0.2%	1.08
Cranston	6,863	21.3%	9.4%	12.0%	2.28
Cumberland	1,831	9.8%	5.6%	4.3%	1.77
East Greenwich	641	3.4%	3.4%	0.1%	1.02
East Providence	3,003	8.7%	5.1%	3.5%	1.68
Foster	271	3.3%	0.5%	2.8%	6.59
Glocester	925	4.2%	1.6%	2.7%	2.70
Hopkinton	653	3.5%	1.9%	1.6%	1.82
Jamestown	342	2.9%	0.8%	2.2%	3.82
Johnston	2,710	13.0%	6.3%	6.7%	2.07
Lincoln	576	14.6%	6.0%	8.6%	2.42
Little Compton	289	4.8%	0.5%	4.4%	10.20
Middletown	1,104	8.2%	4.3%	4.0%	1.92
Narragansett	1,385	4.0%	2.0%	2.0%	1.98
Newport	1,455	7.8%	6.3%	1.5%	1.23
North Kingstown	850	6.4%	3.8%	2.6%	1.69
North Providence	1,881	17.0%	7.3%	9.7%	2.32
North Smithfield	1,066	15.0%	3.7%	11.3%	4.09
Pawtucket	5,294	22.6%	16.0%	6.6%	1.41
Portsmouth	2,034	4.5%	2.4%	2.1%	1.89
Providence	4,340	36.8%	22.9%	13.9%	1.61
Richmond	437	3.0%	2.3%	0.7%	1.31
Scituate	802	2.9%	1.7%	1.2%	1.71
Smithfield	1,994	6.2%	4.4%	1.8%	1.41
South Kingstown	1,520	3.1%	3.4%	-0.3%	0.92
Tiverton	1,187	3.9%	1.3%	2.6%	3.01
Warren	1,112	4.0%	2.5%	1.6%	1.64
Warwick	3,484	7.1%	4.9%	2.2%	1.46
West Greenwich	292	3.1%	3.2%	-0.2%	0.95
West Warwick	1,744	4.9%	4.5%	0.4%	1.09
Westerly	1,488	2.5%	2.7%	-0.2%	0.92
Woonsocket	1,669	16.5%	9.9%	6.6%	1.67

Table E.7: Ratio of Minority Residents to Minority Resident Stops, All Departments

Department Name	Number of Residents	% Minority Residents	Resident Stops	% Minority Resident Stops	Difference	Ratio
Barrington	12,292	4.8%	1,469	6.6%	1.8%	1.39
Bristol	19,740	4.2%	2,841	3.0%	-1.2%	0.71
Burrillville	12,749	2.0%	882	2.4%	0.4%	1.19
Central Falls	14,248	69.8%	1,351	81.7%	11.9%	1.17
Charlestown	6,456	4.0%	547	6.8%	2.7%	1.67
Coventry	28,241	3.4%	3,774	3.7%	0.3%	1.08
Cranston	66,122	20.3%	8,086	30.0%	9.7%	1.48
Cumberland	26,912	8.3%	1,803	10.9%	2.6%	1.31
East Greenwich	10,174	6.5%	375	7.5%	1.0%	1.15
East Providence	39,044	15.6%	2,222	24.3%	8.7%	1.56
Foster	3,662	0.0%	139	1.4%	1.4%	N/A
Glocester	7,839	1.0%	299	1.7%	0.7%	1.70
Hopkinton	6,443	2.5%	67	11.9%	9.5%	4.87
Jamestown	4,355	0.0%	346	3.2%	3.2%	N/A
Johnston	23,899	8.9%	1,058	17.2%	8.3%	1.93
Lincoln	16,911	8.2%	435	11.5%	3.3%	1.40
Little Compton	2,865	0.0%	340	0.6%	0.6%	N/A
Middletown	12,812	12.5%	932	20.9%	8.4%	1.67
Narragansett	13,911	4.3%	1,132	7.5%	3.2%	1.74
Newport	21,066	18.1%	2,602	29.3%	11.2%	1.62
North Kingstown	20,989	5.5%	1,000	6.9%	1.4%	1.26
North Providence	27,231	14.4%	1,697	25.9%	11.5%	1.80
North Smithfield	9,793	3.5%	322	11.5%	8.0%	3.32
Pawtucket	56,546	38.7%	5,088	55.4%	16.6%	1.43
Portsmouth	13,901	5.5%	1,388	4.5%	-0.9%	0.83
Providence	141,375	56.9%	10,170	83.7%	26.8%	1.47
Richmond	5,992	2.7%	124	4.0%	1.4%	1.51
Scituate	8,282	0.9%	245	2.0%	1.1%	2.17
Smithfield	18,280	5.1%	610	5.9%	0.8%	1.15
South Kingstown	25,918	10.1%	700	15.3%	5.2%	1.52
Tiverton	13,138	3.2%	1,407	4.1%	1.0%	1.31
Warren	8,834	3.2%	595	7.4%	4.2%	2.28
Warwick	68,876	7.8%	4,621	8.2%	0.3%	1.04
West Greenwich	4,703	1.8%	110	2.7%	1.0%	1.55
West Warwick	23,958	9.2%	1,504	12.3%	3.1%	1.34
Westerly	18,560	7.0%	2,934	9.8%	2.8%	1.40
Woonsocket	32,338	23.3%	2,610	39.6%	16.3%	1.70

Table E.8: Ratio of Black Residents to Black Resident Stops, All Departments

Department Name	Number of Residents	% Black Residents	Resident Stops	% Black Resident Stops	Difference	Ratio
Barrington	12,292	0.0%	1,469	1.8%	1.8%	N/A
Bristol	19,740	0.7%	2,841	1.3%	0.5%	1.74
Burrillville	12,749	0.0%	882	1.1%	1.1%	N/A
Central Falls	14,248	6.8%	1,351	14.2%	7.4%	2.08
Charlestown	6,456	0.0%	547	1.8%	1.8%	N/A
Coventry	28,241	0.5%	3,774	1.8%	1.3%	3.44
Cranston	66,122	4.6%	8,086	9.6%	4.9%	2.06
Cumberland	26,912	1.1%	1,803	3.4%	2.3%	3.02
East Greenwich	10,174	0.8%	375	0.5%	-0.3%	0.65
East Providence	39,044	5.2%	2,222	18.0%	12.8%	3.46
Foster	3,662	0.0%	139	0.7%	0.7%	N/A
Glocester	7,839	0.0%	299	0.7%	0.7%	N/A
Hopkinton	6,443	0.0%	67	1.5%	1.5%	N/A
Jamestown	4,355	0.0%	346	2.3%	2.3%	N/A
Johnston	23,899	1.6%	1,058	4.3%	2.6%	2.58
Lincoln	16,911	1.3%	435	3.0%	1.7%	2.27
Little Compton	2,865	0.0%	340	0.0%	0.0%	N/A
Middletown	12,812	4.2%	932	12.8%	8.5%	3.01
Narragansett	13,911	0.7%	1,132	5.1%	4.4%	7.06
Newport	21,066	6.1%	2,602	18.1%	12.0%	2.95
North Kingstown	20,989	0.8%	1,000	3.3%	2.5%	4.07
North Providence	27,231	3.9%	1,697	12.7%	8.8%	3.26
North Smithfield	9,793	0.0%	322	3.7%	3.7%	N/A
Pawtucket	56,546	11.1%	5,088	26.8%	15.7%	2.41
Portsmouth	13,901	1.3%	1,388	3.0%	1.7%	2.36
Providence	141,375	12.4%	10,170	33.3%	20.8%	2.68
Richmond	5,992	0.0%	124	2.4%	2.4%	N/A
Scituate	8,282	0.0%	245	0.8%	0.8%	N/A
Smithfield	18,280	1.2%	610	2.0%	0.8%	1.65
South Kingstown	25,918	2.1%	700	9.0%	6.9%	4.25
Tiverton	13,138	0.8%	1,407	2.6%	1.9%	3.45
Warren	8,834	0.9%	595	5.0%	4.2%	5.86
Warwick	68,876	1.4%	4,621	3.7%	2.3%	2.60
West Greenwich	4,703	0.0%	110	0.0%	0.0%	N/A
West Warwick	23,958	1.9%	1,504	5.3%	3.4%	2.84
Westerly	18,560	0.8%	2,934	4.0%	3.2%	5.00
Woonsocket	32,338	4.9%	2,610	12.3%	7.4%	2.52

Table E.9: Ratio of Hispanic Residents to Hispanic Resident Stops, All Departments

Department Name	Number of Residents	% Hispanic Residents	Resident Stops	% Hispanic Resident Stops	Difference	Ratio
Barrington	12,292	1.6%	1,469	1.3%	-0.3%	0.82
Bristol	19,740	1.7%	2,841	0.9%	-0.9%	0.50
Burrillville	12,749	1.3%	882	1.0%	-0.3%	0.77
Central Falls	14,248	57.6%	1,351	67.2%	9.6%	1.17
Charlestown	6,456	1.3%	547	2.0%	0.7%	1.49
Coventry	28,241	1.4%	3,774	1.1%	-0.3%	0.81
Cranston	66,122	9.2%	8,086	15.8%	6.6%	1.72
Cumberland	26,912	3.8%	1,803	6.1%	2.3%	1.60
East Greenwich	10,174	1.3%	375	2.9%	1.6%	2.23
East Providence	39,044	3.1%	2,222	5.7%	2.6%	1.86
Foster	3,662	0.0%	139	0.0%	0.0%	N/A
Glocester	7,839	1.0%	299	0.7%	-0.3%	0.68
Hopkinton	6,443	1.6%	67	7.5%	5.8%	4.58
Jamestown	4,355	0.0%	346	0.6%	0.6%	N/A
Johnston	23,899	4.6%	1,058	11.7%	7.2%	2.57
Lincoln	16,911	3.3%	435	4.1%	0.9%	1.27
Little Compton	2,865	0.0%	340	0.6%	0.6%	N/A
Middletown	12,812	3.9%	932	7.4%	3.5%	1.91
Narragansett	13,911	1.4%	1,132	1.1%	-0.3%	0.82
Newport	21,066	6.8%	2,602	10.6%	3.8%	1.56
North Kingstown	20,989	1.8%	1,000	2.2%	0.4%	1.20
North Providence	27,231	6.5%	1,697	12.6%	6.1%	1.95
North Smithfield	9,793	1.8%	322	6.8%	5.0%	3.74
Pawtucket	56,546	17.4%	5,088	28.0%	10.6%	1.61
Portsmouth	13,901	1.7%	1,388	0.9%	-0.8%	0.51
Providence	141,375	33.5%	10,170	47.9%	14.3%	1.43
Richmond	5,992	1.5%	124	0.0%	-1.5%	0.00
Scituate	8,282	0.9%	245	0.8%	-0.1%	0.87
Smithfield	18,280	2.0%	610	2.0%	0.0%	0.99
South Kingstown	25,918	2.7%	700	2.7%	0.0%	1.00
Tiverton	13,138	0.8%	1,407	1.0%	0.2%	1.18
Warren	8,834	1.4%	595	2.0%	0.6%	1.44
Warwick	68,876	2.8%	4,621	3.2%	0.4%	1.14
West Greenwich	4,703	1.8%	110	1.8%	0.1%	1.03
West Warwick	23,958	3.8%	1,504	6.2%	2.4%	1.61
Westerly	18,560	2.2%	2,934	3.4%	1.2%	1.54
Woonsocket	32,338	10.7%	2,610	23.3%	12.6%	2.18

Table E.10: Departments with Disparities Relative to Descriptive Benchmarks

Department Name	State Average			EDP			Resident Population			Total
	M	B	H	M	B	H	M	B	H	
Providence				24.1	15.8	13.9	26.8	20.8	14.3	6
North Smithfield	21.7		12.3	20	9	11.3	8		5	5.5
North Providence	12.2			16.9	10.8	9.7	11.5	8.8	6.1	5.5
Cranston	12.4			19	9.4	12				3.5
Pawtucket					9.2		16.6	15.7	10.6	3.5
Johnston				11.3	6.1	6.7	8.3		7.2	3
Lincoln	11			10.7		8.6				2.5
Newport					5.2		11.2	12		2.5
Woonsocket							16.3	7.4	12.6	2.5
Central Falls					9.8		11.9	7.4		2
Hopkinton				5.8			9.5		5.8	1.5
East Providence					9.1			12.8		1.5
Warren				5.7	5					1
Portsmouth				5.6	5.4					1
Middletown					6.8			8.5		1
Foster				8.6						0.5
Barrington				6.5						0.5
Little Compton				5.1						0.5
Jamestown				5.1						0.5
Glocester				5.1						0.5
Smithfield					5					0.5
South Kingstown								6.9		0.5

APPENDIX F

Table F.1: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Barrington	Chi^2	187.367***	180.139***	1.000	1.000
	P-Value	0.000	0.000	1.000	1.000
	Q-Value	0.001	0.001	N/A	N/A
	Pseudo R2	0.328	0.331	0.331	0.324
	Sample Size	4600	4484	4451	4775
Bristol	Chi^2	196.020***	573.775	261.003	524.192
	P-Value	0.000	N/A	N/A	N/A
	Q-Value	0.001	N/A	N/A	N/A
	Pseudo R2	0.194	0.197	0.199	0.197
	Sample Size	6609	6540	6478	6738
Burrillville	Chi^2	358.886	209.061***	209.988***	1.000
	P-Value	N/A	0.000	0.000	1.000
	Q-Value	N/A	0.001	0.001	N/A
	Pseudo R2	0.272	0.272	0.273	0.273
	Sample Size	4164	4144	4141	4271
Central Falls	Chi^2	1.000	112.081***	87.866***	54.589***
	P-Value	1.000	0.000	0.000	0.001
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.367	0.361	0.317	0.296
	Sample Size	2296	2273	3251	3938
Charlestown	Chi^2	104.702***	1.000	503.766	262.895
	P-Value	0.000	1.000	N/A	N/A
	Q-Value	0.001	N/A	N/A	N/A
	Pseudo R2	0.234	0.245	0.232	0.238
	Sample Size	2413	2351	2284	2407
Coventry	Chi^2	482.696	2843.909	214.539***	532.62
	P-Value	N/A	N/A	0.000	N/A
	Q-Value	N/A	N/A	0.001	N/A
	Pseudo R2	0.226	0.226	0.224	0.224
	Sample Size	7018	6964	6925	7130
Cranston	Chi^2	30.847	36.338*	35.779*	40.692**
	P-Value	0.194	0.067	0.075	0.025
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.275	0.275	0.268	0.273
	Sample Size	22099	21023	21969	25870
Cumberland	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.252	0.254	0.25	0.243
	Sample Size	4504	4411	4564	4926
DEM	Chi^2	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	N/A	N/A	N/A	N/A
	Sample Size	N/A	N/A	N/A	N/A

Table F.1: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
East Greenwich	Chi^2	1.000	1.000	1.000	892.341
	P-Value	1.000	1.000	1.000	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.252	0.254	0.27	0.252
	Sample Size	2185	2143	2113	2205
East Providence	Chi^2	31.003	28.513	142.654***	34.884*
	P-Value	0.188	0.284	0.000	0.09
	Q-Value	N/A	N/A	0.001	N/A
	Pseudo R2	0.358	0.361	0.37	0.347
	Sample Size	9265	9115	8161	9940
Foster	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.319	0.335	0.331	0.312
	Sample Size	1856	1785	1772	1912
Glocester	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.23	0.231	0.236	0.229
	Sample Size	2291	2261	2253	2335
Hopkinton	Chi^2	1.000	407.99	1.000	1.000
	P-Value	1.000	N/A	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.254	0.238	0.261	0.254
	Sample Size	2166	2093	2051	2187
Jamestown	Chi^2	1.000	177.772***	444.587	1.000
	P-Value	1.000	0.000	N/A	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.331	0.337	0.335	0.34
	Sample Size	1339	1302	1297	1361
Johnston	Chi^2	354.752	178.820***	58.693***	90.055***
	P-Value	N/A	0.000	0.000	0.000
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.301	0.308	0.289	0.289
	Sample Size	4609	4513	4733	5206
Lincoln	Chi^2	210.121***	183.992***	331.089	206.386***
	P-Value	0.000	0.000	N/A	0.000
	Q-Value	0.001	0.001	N/A	0.001
	Pseudo R2	0.317	0.319	0.307	0.3
	Sample Size	1671	1619	1730	1897
Little Compton	Chi^2	175.406***	292.838	1.000	1.000
	P-Value	0.000	N/A	1.000	1.000
	Q-Value	0.001	N/A	N/A	N/A
	Pseudo R2	0.402	0.402	0.407	0.402
	Sample Size	1348	1332	1350	1376

Table F.1: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Middletown	Chi^2	1.000	1.000	281.207	1.000
	P-Value	1.000	1.000	N/A	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.216	0.216	0.208	0.211
	Sample Size	4420	4361	4155	4687
Narragansett	Chi^2	207.283***	179.233***	118.689***	723.89
	P-Value	0.000	0.000	0.000	N/A
	Q-Value	0.001	0.001	0.001	N/A
	Pseudo R2	0.236	0.236	0.234	0.231
	Sample Size	5221	5138	5063	5373
Newport	Chi^2	208.490***	96.557***	123.505***	121.578***
	P-Value	0.000	0.000	0.000	0.000
	Q-Value	0.001	0.001	0.001	0.001
	Pseudo R2	0.331	0.328	0.331	0.314
	Sample Size	6060	5970	5640	6427
North Kingstown	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.238	0.243	0.243	0.228
	Sample Size	4894	4797	4743	5091
North Providence	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.256	0.259	0.272	0.248
	Sample Size	4938	4883	4770	5736
North Smithfield	Chi^2	1.000	1.000	170.126***	65.175***
	P-Value	1.000	1.000	0.000	0.000
	Q-Value	N/A	N/A	0.001	0.001
	Pseudo R2	0.307	0.308	0.3	0.28
	Sample Size	3010	2916	2992	3451
Pawtucket	Chi^2	106.166***	89.803***	119.127***	64.276***
	P-Value	0.000	0.000	0.000	0.000
	Q-Value	0.001	0.001	0.001	0.001
	Pseudo R2	0.363	0.319	0.358	0.356
	Sample Size	11607	11444	11113	13975
Portsmouth	Chi^2	2268.318	1.000	2112.908	1.000
	P-Value	N/A	1.000	N/A	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.221	0.222	0.228	0.217
	Sample Size	7310	7221	6890	7559
Providence	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.168	0.168	0.188	0.171
	Sample Size	10998	10577	10518	14867

Table F.1: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Richmond	Chi^2	852.171	1.000	1699.951	172.906***
	P-Value	N/A	1.000	N/A	0.000
	Q-Value	N/A	N/A	N/A	0.001
	Pseudo R2	0.541	0.554	0.559	0.532
	Sample Size	1534	1496	1440	1525
RISP - Chepachet	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.223	0.223	0.224	0.208
	Sample Size	5612	5452	5532	6744
RISP - Hope Valley	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.185	0.186	0.19	0.18
	Sample Size	7111	6701	6273	7727
RISP - HQ	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.483	0.486	0.493	0.483
	Sample Size	1971	1931	1916	2143
RISP - Lincoln	Chi^2	1.000	1.000	25.606	22.195
	P-Value	1.000	1.000	0.428	0.624
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.194	0.194	0.18	0.184
	Sample Size	8879	8604	8321	10683
RISP - Wickford	Chi^2	1.000	1.000	458.04	1.000
	P-Value	1.000	1.000	N/A	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.202	0.202	0.202	0.192
	Sample Size	8641	8402	8077	9560
Scituate	Chi^2	236.438***	197.983***	1.000	1.000
	P-Value	0.000	0.000	1.000	1.000
	Q-Value	0.001	0.001	N/A	N/A
	Pseudo R2	0.21	0.208	0.217	0.212
	Sample Size	2719	2685	2687	2774
Smithfield	Chi^2	548.726	209.819***	1.000	1.000
	P-Value	N/A	0.000	1.000	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.196	0.201	0.209	0.197
	Sample Size	4957	4868	4791	5175
South Kingstown	Chi^2	1.000	1.000	415.329	1.000
	P-Value	1.000	1.000	N/A	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.24	0.243	0.229	0.241
	Sample Size	5328	5188	4943	5339

Table F.1: Multinomial Logistic Regression of Outcome on Minority Status and Reason for Stop by Department, All Traffic Stops 2017

Department	Variable	Non-White	Black	Hispanic	Black or Hispanic
Tiverton	Chi^2	554.607	411.329	358.631	322.915
	P-Value	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.197	0.196	0.204	0.188
	Sample Size	4574	4528	4507	4747
Univ Of Rhode Island	Chi^2	1.000	311.178	1.000	1.000
	P-Value	1.000	N/A	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.555	0.497	0.547	0.503
	Sample Size	835	794	741	852
Warren	Chi^2	362.019	238.393***	772.565	1.000
	P-Value	N/A	0.000	N/A	1.000
	Q-Value	N/A	0.001	N/A	N/A
	Pseudo R2	0.268	0.266	0.28	0.268
	Sample Size	2667	2643	2572	2750
Warwick	Chi^2	1.000	1.000	1.000	1.000
	P-Value	1.000	1.000	1.000	1.000
	Q-Value	N/A	N/A	N/A	N/A
	Pseudo R2	0.273	0.273	0.25	0.257
	Sample Size	11134	10910	10803	11715
West Greenwich	Chi^2	100.713***	71.544***	46.717***	1.000
	P-Value	0.000	0.000	0.000	1.000
	Q-Value	0.001	0.001	0.001	N/A
	Pseudo R2	0.545	0.55	0.56	0.578
	Sample Size	881	872	866	886
West Warwick	Chi^2	342.682	273.584	303.63	76.359***
	P-Value	N/A	N/A	N/A	0.000
	Q-Value	N/A	N/A	N/A	0.001
	Pseudo R2	0.333	0.291	0.326	0.331
	Sample Size	4356	4300	4276	4526
Westerly	Chi^2	191.361***	949.453	2580.01	258.273
	P-Value	0.000	N/A	N/A	N/A
	Q-Value	0.001	N/A	N/A	N/A
	Pseudo R2	0.193	0.21	0.224	0.196
	Sample Size	5940	5793	5689	5947
Woonsocket	Chi^2	640.129	172.391***	140.902***	110.794***
	P-Value	N/A	0.000	0.000	0.000
	Q-Value	N/A	0.001	0.001	0.001
	Pseudo R2	0.298	0.3	0.3	0.279
	Sample Size	4396	4215	4501	5096

APPENDIX G

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
Barrington	Hit Rate	31%	N/A	N/A	N/A	23.528%
	Contraband	31	N/A	N/A	N/A	8
	Searches	100	N/A	N/A	N/A	34
	Chi2	N/A	N/A	N/A	N/A	0.685
	P-Value	N/A	N/A	N/A	N/A	0.407
	Q-Value	N/A	N/A	N/A	N/A	0.509
Bristol	Hit Rate	51.898%	N/A	N/A	N/A	N/A
	Contraband	41	N/A	N/A	N/A	N/A
	Searches	79	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Burrillville	Hit Rate	32.050%	N/A	N/A	N/A	N/A
	Contraband	25	N/A	N/A	N/A	N/A
	Searches	78	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Central Falls	Hit Rate	N/A	N/A	N/A	26.666%	28.204%
	Contraband	N/A	N/A	N/A	8	11
	Searches	N/A	N/A	N/A	30	39
	Chi2	N/A	N/A	N/A	1.439	1.794
	P-Value	N/A	N/A	N/A	0.230	0.180
	Q-Value	N/A	N/A	N/A	0.374	0.319
Charlestown	Hit Rate	41.935%	N/A	N/A	N/A	N/A
	Contraband	13	N/A	N/A	N/A	N/A
	Searches	31	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Coventry	Hit Rate	40%	N/A	N/A	N/A	N/A
	Contraband	46	N/A	N/A	N/A	N/A
	Searches	115	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Cranston	Hit Rate	27.016%	19.125%%+	17.177%**	16.778%**	18.148%**
	Contraband	67	35	28	25	49
	Searches	248	183	163	149	270
	Chi2	N/A	3.628	5.356	5.479	5.848
	P-Value	N/A	0.057	0.020	0.018	0.016
	Q-Value	N/A	0.123	0.046	0.046	0.041

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
Cumberland	Hit Rate	39.023%	N/A	N/A	N/A	N/A
	Contraband	16	N/A	N/A	N/A	N/A
	Searches	41	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
DEM	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
East Greenwich	Hit Rate	40%	N/A	N/A	N/A	N/A
	Contraband	12	N/A	N/A	N/A	N/A
	Searches	30	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
East Providence	Hit Rate	12.602%	4.579%**	3.200%***	1.235%***	2.703%***
	Contraband	31	6	4	1.000	5
	Searches	246	131	125	81	185
	Chi2	N/A	6.214	8.574	8.918	13.515
	P-Value	N/A	0.013	0.003	0.003	0.001
	Q-Value	N/A	0.037	0.016	0.016	0.001
Foster	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Glocester	Hit Rate	25.714%	N/A	N/A	N/A	N/A
	Contraband	9	N/A	N/A	N/A	N/A
	Searches	35	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Hopkinton	Hit Rate	22.368%	N/A	N/A	N/A	N/A
	Contraband	17	N/A	N/A	N/A	N/A
	Searches	76	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
Jamestown	Hit Rate	13.953%	N/A	N/A	N/A	N/A
	Contraband	6	N/A	N/A	N/A	N/A
	Searches	43	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Johnston	Hit Rate	36.735%	N/A	N/A	N/A	N/A
	Contraband	18	N/A	N/A	N/A	N/A
	Searches	49	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Lincoln	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Little Compton	Hit Rate	32.609%	N/A	N/A	N/A	N/A
	Contraband	15	N/A	N/A	N/A	N/A
	Searches	46	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Middletown	Hit Rate	16.455%	N/A	N/A	N/A	N/A
	Contraband	13	N/A	N/A	N/A	N/A
	Searches	79	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Narragansett	Hit Rate	22.413%	N/A	N/A	N/A	N/A
	Contraband	13	N/A	N/A	N/A	N/A
	Searches	58	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Newport	Hit Rate	25%	N/A	N/A	N/A	15%
	Contraband	21	N/A	N/A	N/A	6
	Searches	84	N/A	N/A	N/A	40
	Chi2	N/A	N/A	N/A	N/A	1.590
	P-Value	N/A	N/A	N/A	N/A	0.207
	Q-Value	N/A	N/A	N/A	N/A	0.351

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
North Kingstown	Hit Rate	43.590%	N/A	N/A	N/A	N/A
	Contraband	51	N/A	N/A	N/A	N/A
	Searches	117	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
North Providence	Hit Rate	37.255%	12.121%**	12.121%**	N/A	16.070%**
	Contraband	19	4	4	N/A	9
	Searches	51	33	33	N/A	56
	Chi2	N/A	6.364	6.364	N/A	6.198
	P-Value	N/A	0.012	0.012	N/A	0.013
	Q-Value	N/A	0.037	0.037	N/A	0.037
North Smithfield	Hit Rate	51.514%	N/A	N/A	N/A	N/A
	Contraband	17	N/A	N/A	N/A	N/A
	Searches	33	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Pawtucket	Hit Rate	41.221%	16.841%***	14.942%***	40.323%	27.006%**
	Contraband	54	16	13	25	37
	Searches	131	95	87	62	137
	Chi2	N/A	15.307	16.958	0.014	6.032
	P-Value	N/A	0.001	0.001	0.906	0.014
	Q-Value	N/A	0.001	0.001	0.906	0.039
Portsmouth	Hit Rate	40%	N/A	N/A	N/A	N/A
	Contraband	34	N/A	N/A	N/A	N/A
	Searches	85	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Providence	Hit Rate	13.734%	6.415%***	6.502%***	7.230%***	7.031%***
	Contraband	32	46	45	41	76
	Searches	233	717	692	567	1081
	Chi2	N/A	12.496	11.942	8.420	11.418
	P-Value	N/A	0.001	0.001	0.004	0.001
	Q-Value	N/A	0.001	0.001	0.016	0.001
Richmond	Hit Rate	53.333%	N/A	N/A	N/A	N/A
	Contraband	16	N/A	N/A	N/A	N/A
	Searches	30	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
RISP - Chepachet	Hit Rate	35.848%	N/A	N/A	N/A	29.412%
	Contraband	19	N/A	N/A	N/A	10
	Searches	53	N/A	N/A	N/A	34
	Chi2	N/A	N/A	N/A	N/A	0.386
	P-Value	N/A	N/A	N/A	N/A	0.533
	Q-Value	N/A	N/A	N/A	N/A	0.630
RISP - Hope Valley	Hit Rate	33.765%	46.340%	50%%+	25.641%	36.363%
	Contraband	26	19	18	10	24
	Searches	77	41	36	39	66
	Chi2	N/A	1.792	2.719	0.799	0.104
	P-Value	N/A	0.180	0.098	0.372	0.745
	Q-Value	N/A	0.319	0.203	0.504	0.786
RISP - HQ	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
RISP - Lincoln	Hit Rate	40.425%	31.944%	33.897%	32.075%	34.375%
	Contraband	38	23	20	17	33
	Searches	94	72	59	53	96
	Chi2	N/A	1.261	0.656	1.008	0.742
	P-Value	N/A	0.261	0.418	0.314	0.388
	Q-Value	N/A	0.407	0.509	0.472	0.504
RISP - Wickford	Hit Rate	40.708%	N/A	N/A	25.805%	32.652%
	Contraband	46	N/A	N/A	8	16
	Searches	113	N/A	N/A	31	49
	Chi2	N/A	N/A	N/A	2.305	0.939
	P-Value	N/A	N/A	N/A	0.128	0.333
	Q-Value	N/A	N/A	N/A	0.252	0.479
Scituate	Hit Rate	23.256%	N/A	N/A	N/A	N/A
	Contraband	10	N/A	N/A	N/A	N/A
	Searches	43	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Smithfield	Hit Rate	38.158%	N/A	N/A	N/A	N/A
	Contraband	29	N/A	N/A	N/A	N/A
	Searches	76	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
South Kingstown	Hit Rate	27.273%	N/A	N/A	N/A	N/A
	Contraband	24	N/A	N/A	N/A	N/A
	Searches	88	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Tiverton	Hit Rate	32.758%	N/A	N/A	N/A	N/A
	Contraband	19	N/A	N/A	N/A	N/A
	Searches	58	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Univ Of Rhode Island	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Warren	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Warwick	Hit Rate	28.926%	N/A	N/A	N/A	32.257%
	Contraband	35	N/A	N/A	N/A	10
	Searches	121	N/A	N/A	N/A	31
	Chi2	N/A	N/A	N/A	N/A	0.130
	P-Value	N/A	N/A	N/A	N/A	0.717
	Q-Value	N/A	N/A	N/A	N/A	0.777
West Greenwich	Hit Rate	N/A	N/A	N/A	N/A	N/A
	Contraband	N/A	N/A	N/A	N/A	N/A
	Searches	N/A	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
West Warwick	Hit Rate	35.293%	N/A	N/A	N/A	N/A
	Contraband	24	N/A	N/A	N/A	N/A
	Searches	68	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A

Table G.1: Chi-Square Test of Hit-Rate by Department, All Discretionary Searches

Department	Variable	Caucasian	Non-Caucasian	Black	Hispanic	Black or Hispanic
Westerly	Hit Rate	25.517%	N/A	N/A	N/A	N/A
	Contraband	37	N/A	N/A	N/A	N/A
	Searches	145	N/A	N/A	N/A	N/A
	Chi2	N/A	N/A	N/A	N/A	N/A
	P-Value	N/A	N/A	N/A	N/A	N/A
	Q-Value	N/A	N/A	N/A	N/A	N/A
Woonsocket	Hit Rate	20.754%	26.923%	18.750%	17.948%	18.333%
	Contraband	22	14	6	7	11
	Searches	106	52	32	39	60
	Chi2	N/A	0.754	0.061	0.140	0.141
	P-Value	N/A	0.384	0.805	0.708	0.707
	Q-Value	N/A	0.504	0.825	0.777	0.777