Urbana IDOT Traffic Stop Data Task Force

Statistics Subcommittee Report

Prepared for Meeting on March 18, 2015

Executive Summary

The State of Illinois requires that police departments collect information on traffic stops for the purpose of assessing racial bias, disparities and profiling in policing. One approach to measuring racial disparities with these data is to compare the proportion of minorities who are stopped to the estimated proportion of minority drivers in the population. The disparity measured by this ratio for Urbana, IL, from 2004 to 2013 ranges between a high of 1.7 in 2010 and a low of 1.07 in 2012. The observed disparity among minorities as a whole is due almost entirely to disparities in the rates at which African Americans are stopped, which ranges from a low of 1.71 in 2012 and 2013 to a high of 2.18 in 2010.

All else equal–that is, if the probability of being stopped was equal for all drivers–we would expect that these ratios to be close to one, with numbers higher than one suggesting that minorities are more likely to be stopped than we would expect given their relative distribution in the population. All else is rarely equal, however, and there are many factors that could give rise to these disparities. Below we consider three broad categories of explanations that could give rise to the observed racial disparities in traffic stops in Urbana:

1. Demographic and and socio-economic differences
2. Patterns of policing
3. Racial profiling

These factors are by no means the only explanations for racial disparities nor are they mutually exclusive, but they are some of the most commonly considered causes. After the considering the extent to which the data either do or do not support each explanation, we conclude by discussing some of the broader legal and economic impacts of traffic stop disparities.

Demographic and Socioeconomic Differences

Demographic and socio-economic differences across racial groups may explain part of the disparity in stops. Older cars are more likely to have equipment failures like a broken taillight. If some racial groups are more likely to drive older cars, then we might expect that these groups would be more likely to be pulled over for equipment violations. Similarly, if younger drivers are more inexperienced and more likely to commit traffic violations, then to the extent that some racial groups demographically younger than others, this might also produce disparities in the rates at which these groups are stopped.

The data provide some support for this claim. African Americans and Hispanics do tend to drive older cars and are more likely to be pulled over for equipment violations. Minority drivers who are stopped also tend to be younger than white drivers, possibly reflecting underlying demographic differences in the age of these driving populations. We believe it is unlikely, however, that demographic differences alone explain the racial disparities in traffic stops that we observe. For example, if socioeconomic differences were the only factor at play, we would expect African Americans and Hispanics–two groups that possess similar demographic profiles in our data–to be stopped at roughly the same rates. In fact, African Americans are stopped at rates nearly twice what we would expect given their relative distribution in the population, while Hispanics are stopped at rates somewhat below what we would expect. Demographic and socioeconomic differences may play a role in explaining differences in the type of stops minorities experience, but likely play only a marginal role in explaining overall disparities.

Patterns of Policing

Some areas of Urbana have a higher police presence then others. This is due both to calls for service from citizens and tactical decisions by the police department about where their resources are most effectively used to reduce accidents and crime. To the extent that minorities live in areas with a higher police presence, this could account for some of the disparity in the rates at which minorities are stopped.

The data provide some support for this view. Urbana is divided into five police beats. Each beat is divided into smaller regions called geocodes, which are used to report the locations of both stops and calls for service.[1] The data for calls for service are available for 2010 to 2013 with positive correlations between stops and calls for service ranging from a low of 0.41 in 2012 to a high of 0.53 in 2011. We combine this data with information from the 2010 U.S. Census to provide an estimate of the racial composition of each geocode. We see that geocodes with more calls for service tend to have more traffic stops and a higher percentage of residents who are minorities.

The Census data also allow us to construct local measures of the racial disparity in traffic stops for geocodes. As with the measures reported for the City of Urbana, for each geocode, we compare the proportion of stops involving a minority driver to the estimated minority population living in that area. In areas with a higher concentration of minority residents, more stops tend to involve minority drivers. However, in neighborhoods with relatively few minorities, minority drivers appear to be stopped at rates higher than we would expect.

Some caution is required interpreting these results. Both these local estimates and the IDOT measures of disparity rely on Census estimates of the racial composition of the driving population or the pool of potential drivers who could be stopped. While this may be reasonable baseline when estimating disparities for Urbana as whole, the assumption is more questionable when trying to produce neighborhood specific estimates of disparities. For example, the geocode associated with Meadowbrook Park, contains a residential community with very few minorities (about 3 percent). However, the actual racial composition of drivers along Windsor Road is likely far more diverse, and so the persistently high estimates of disparities our localized measure produces for this geocode may simply reflect that the baseline we are using here is an inaccurate estimate the true racial composition of drivers passing through Meadowbrook Park. Still, not all neighborhoods with small estimated minority populations have high measures of disparity, and the ones that do tend to be the same from year to year, providing some evidence that minorities are more likely to be stopped when driving in neighborhoods where minorities are less likely to live.[2]

For 2013, we are also able to assess the relative disparities in stops when police are focused specifically on enforcing traffic safety laws through the Selective Traffic Enforcement Program (STEP). The Urbana Police Department describes the program as follows:

\begin{quote} The STEP project is a course of action, by the Urbana Police Department, in which specific sites in the city are slated for concentrated traffic enforcement. These sites are normally selected by statistical data which indicates an area with high traffic accidents, in particular, is the Lincoln Avenue corridor from Bradley Avenue to Florida. Other sites are selected based on input from citizens of traffic concerns in a particular area or neighborhood.[3] \end{quote}

Looking at this subset of STEP stops, we see that minorities are stopped at relatively lower rates in the program although African Americans are still about 25 percent more likely to be stopped than we would expect. Outside of the STEP program, the disparity estimates are significantly higher for African Americans.

Racial Profiling

Minorities, and in particular African Americans, are significantly more likely to be stopped given their relative representation in the driving population of Urbana. This fact may be evidence that racial profiling is

[1] There are around a 140 total geocodes depending on the year. Geocodes vary in size. In residential neighborhoods, they generally correspond to several city blocks, and are somewhat larger in more commercial areas or sparsely populated sections of Urbana.

[2] Note that when there are relatively few traffic stops and or/few minorities in a geocode, small changes in either of these amounts can have a large effect on the estimated disparity for that geocode. One way to account for the inherent volatility of this measure is to calculate the variance of our estimate and use that variance to construct confidence intervals around our estimate. The substance of our findings remains unchanged when we limit our consideration to geocodes where the 95-percent confidence interval for the estimate of racial disparity does not include one (i.e. no racial disparity in stops).

[3] See http://urbanaillinois.us/departments/police/police-systems

occurring, but it may also reflect other factors like demographic differences and patterns of policing more broadly, or some observed characteristic not captured in the data. Disentangling these factors and ruling out potentially unobserved factors, is difficult. Here we consider one test for racial profiling designed to overcome these challenges.[4].

The basic logic of the test–sometimes called the "veil of darkness"– is relatively simple: If we think racial profiling is occurring, then it should be harder to do when it is dark out than when it is light out. Since the sun sets at different times during the year, traffic stops that occur during this inter-twilight period (times when it could be light or dark out depending on the time of year) provide a sort of natural experiment in which to test for racial profiling. In theory, the only thing that should differ between drivers stopped at 7 pm in December and 7 pm in the June, is that it was light out in June and dark out in December.[5] If minorities are less likely to be stopped when it is dark out, than this provides evidence that profiling is occurring.

While the basic logic of this approach is relatively simple, actually implementing the test requires us to make some substantive and statistical choices for which there are not clear right our wrong answers. We conduct this test on ten years of data, and so we would like to separate the effects of the veil of darkness, from any year-to-year variation in traffic stops. Similarly, while the test assumes that the types of drivers on the road at 5 pm when it is light out will be similar to those on the road at 5 pm when it is dark out, why might expect that drivers on the road at 5 pm differ in meaningful ways from drivers at 8 pm, and so we would also want to control for the effects of the time of day when conducting our tests. Finally we might ask whether our test for racial profiling should assume that officers are more focused on stopping minority drivers in general, or black drivers in particular?

We address these questions by estimating models to test our hypothesis. We start with the most basic model, simply asking whether, in the subset of stops that occur during the inter-twilight period (between approximately 4:30 and 8:30 pm), the probability that a stopped driver will be a minority varies according to whether the driver was stopped when it was light or dark out at that time of the year. We then proceed to more complex models that seek to address concerns about the effects of year-to-year variation and the time of day. We then repeat this analysis but this our indicator of whether the stop occurred during the day or night to predict whether the driver was black or not.

The results from these various approaches and specifications unfortunately do not provide a definitive, consistent answer to the question of racial profiling. When the outcome of interest is whether the driver stopped is a minority, the different tests generally do find evidence of profiling (i.e. minorities appear to be no less likely to be stopped when it is dark out compared to when it is light out). Looking just at the probability that a driver stopped will be African American, some of the models appear to provide evidence that is consistent with the presence of racial profiling. For example in some of our more complex models, we allow the "effects" of the veil of darkness in these models to vary conditionally on the year of the study and the time of day, we end up with results suggesting suggest that during some years of the study at some times of the day the data provide evidence of profiling. In trying to more precisely model these relationships, we end up with results that are harder to interpret.

Disparity in Outcomes

The disparity in the rates at which minorities and African Americans are stopped persists in outcomes after the stop. Minorities, in particular, African Americans and Hispanics, are more likely to receive citations as opposed to written warnings when stopped. They are also more likely to be searched and more likely to be subject to stops of longer duration.[6] Relatively few stops (1 to 3 percent of all stops) result in contraband being found, with the majority of contraband found during stops of Whites and African Americans.

[4]See Grogger, Jeffrey, and Greg Ridgeway. "Testing for racial profiling in traffic stops from behind a veil of darkness." Journal of the American Statistical Association 101.475 (2006): 878-887.

[5]The validity of this assumption may be questionable in college town where the minority population varies with the school year.

[6]It should be noted, however, that duration of stops is not always an indicator of poor or unequal treatment. Some stops, for example when a driver lacks a license or proper identification, simply take longer to process than a simple speeding ticket. During our task force meetings we also discussed some cases in which a longer traffic stop reflected an officers attempt to help the driver, for example, by waiting with them until a towing company arrived or helped the driver avoid a ticket for driving without car insurance by allowing them to use their smartphone to track down proof that they had paid for car insurance. While these stops may be longer in duration, the outcomes are probably more preferable from the driver's perspective.

In terms of the financial impact of traffic stops, African Americans and Hispanics pay higher fines on average. This appears to be due primarily to the fact that these minorities are charged with offenses that carry higher fines (such as driving without insurance or a license), are more likely to be charged with multiple offenses, and more likely to be stopped and charged multiple times. Within a particular offense, however, the average fines across racial groups are relatively similar.

Summary

Complex social problems rarely have simple answers. The traffic stop data show that minorities, and in particular African Americans, are more likely to be stopped by the police. The extent to which racial profiling is the cause of these disparities, is a difficult question to answer with these data alone. As discussed above, there are many possible reasons for why we observe these relationships. Socio-economic factors may play a role. The fact that minorities live in neighborhoods with a more larger police presence almost certainly increases the rates at which they are stopped. Whether these disparities also reflect evidence of racial profiling is more difficult to say. The fact that minorities are more likely to be stopped in neighborhoods where they are less likely to live is consistent with racial profiling, but may also reflect inaccurate estimates of the population driving through a neighborhood. Further tests of profiling using the veil of darkness approach are inconclusive, and tend to vary based on the assumptions of a specific model. Overall, this particular analysis can neither rule out the possibility that racial profiling is occurring, nor can it conclude that racial profiling is the sole or root cause of Urbana's racial disparities in traffic stops. Moving forward, both the possibility and perception of racial profiling (whether through conscious decisions or implicit bias) remains a real and significant concern for our community and police.

What the data clearly show is that there is a disparate impact in the rate and outcome of traffic stops in our community. While this evident in the IDOT data alone, it becomes particularly clear when one considers the economic impact of traffic stop disparities in Urbana. Minorities are more likely to be stopped multiple times and charged with multiple offenses that tend to carry higher average fines. Regardless of whether one chooses to interpret the traffic stop data as strong, weak or inconclusive evidence of racial profiling, the disparate impact of these stops likelys contribute the perception that policing is racially motivated or unfairly targeting minorities. Addressing these concerns requires a deeper understanding of both policing and community impact.

Contents

Overview of Analysis

Below are the analyses summarized in the executive summary above and likely to provided as a statistical appendix (with some further context and explanation added where needed) to our final report.

IDOT Disparities

IDOT Disparity Ratios by Year

The State of Illinois requires that police departments collect information on traffic stops for the purpose of assessing racial bias, disparities and profiling in policing. One approach to measuring racial disparities with these data is to compare the proportion of minorities who are stopped to the estimated proportion of minority drivers in the population. The disparity measured by this ratio for Urbana, IL, from 2004 to 2013 ranges between a high of 1.7 in 2010 and a low of 1.07 in 2012.

Table 1: Yearly IDOT Disparity Ratios

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
# White Stops	1948	1707	2131	1854	2194	2240	1476	1463	2169	2365
# Minority Stops	1602	1348	1884	1527	1831	2037	1603	1367	1582	1930
% Stops White	54.9	55.9	53.1	54.8	54.5	52.4	47.9	51.7	57.8	55.1
% Stops Minority	45.1	44.1	46.9	45.2	45.5	47.6	52.1	48.3	42.2	44.9
Min % of Driv Pop	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	39.5	39.5
Disparity	**1.47**	**1.44**	**1.53**	**1.48**	**1.49**	**1.56**	**1.7**	**1.58**	**1.07**	**1.14**

Yearly Disparities by Race

The observed disparity among minorities as a whole is due almost entirely to disparities in the rates at which African Americans are stopped, which ranges from a low of 1.71 in 2012 and 2013 to a high of 2.18 in 2010.

Table 2: Yearly Disparities by Race

African Americans	**AA Stops**	**Total Stops**	**% Total**	**Est % Population**	**Disparity**
2004	1227	3548	0.35	0.17	1.99
2005	1005	3049	0.33	0.17	1.9
2006	1401	4014	0.35	0.17	2.01
2007	1160	3380	0.34	0.17	1.97
2008	1332	4024	0.33	0.17	1.9
2009	1458	4275	0.34	0.17	1.96
2010	1169	3077	0.38	0.17	2.18
2011	992	2829	0.35	0.17	2.02
2012	1116	3746	0.3	0.17	1.71
2013	1273	4287	0.3	0.17	1.71
Hispanics	**HS Stops**	**Total Stops**	**% Total**	**Est % Population**	**Disparity**
2004	112	3548	0.03	0.05	0.63
2005	107	3049	0.04	0.05	0.7
2006	138	4014	0.03	0.05	0.68
2007	115	3380	0.03	0.05	0.68
2008	171	4024	0.04	0.05	0.84
2009	186	4275	0.04	0.05	0.86
2010	139	3077	0.05	0.05	0.9
2011	130	2829	0.05	0.05	0.91
2012	133	3746	0.04	0.05	0.71
2013	157	4287	0.04	0.05	0.73
Asians	**AS Stops**	**Total Stops**	**% Total**	**Est % Population**	**Disparity**
2004	261	3548	0.07	0.14	0.52
2005	230	3049	0.08	0.14	0.53
2006	344	4014	0.09	0.14	0.61
2007	251	3380	0.07	0.14	0.53
2008	327	4024	0.08	0.14	0.57
2009	391	4275	0.09	0.14	0.65
2010	293	3077	0.1	0.14	0.67
2011	244	2829	0.09	0.14	0.61
2012	328	3746	0.09	0.14	0.62
2013	492	4287	0.11	0.14	0.81
Whites	**WH Stops**	**Total Stops**	**% Total**	**Est % Population**	**Disparity**
2004	1948	3548	0.55	0.63	0.87
2005	1707	3049	0.56	0.63	0.89
2006	2131	4014	0.53	0.63	0.84
2007	1854	3380	0.55	0.63	0.87
2008	2194	4024	0.55	0.63	0.86
2009	2240	4275	0.52	0.63	0.83
2010	1476	3077	0.48	0.63	0.76
2011	1463	2829	0.52	0.63	0.82
2012	2169	3746	0.58	0.63	0.92
2013	2365	4287	0.55	0.63	0.87

Note: In 29 stops the drivers identified themselves as Native American. These cases are not included in the analysis above.

Disparities by Stop and Outcome

Demographic and Socio-economic Differences

Driver Residency

Table 3: Traffic Stops and Driver Residency

Driver From:	# Stops	% Total
Urbana	18974	0.52
Urbana-Champaign	27242	0.75
Local	28384	0.78
Within 50 Miles	30875	0.85
Chicago	505	0.01
Illinois	35425	0.98

Just over half of the drivers stopped from 2004-2013 had addresses in Urbana, IL. Three-quarters lived in Urbana-Champaign (Local includes Savoy and St Jospeh),about 85 percent lived within 50 miles, and close to 98 percent lived in-state.

Driver Age

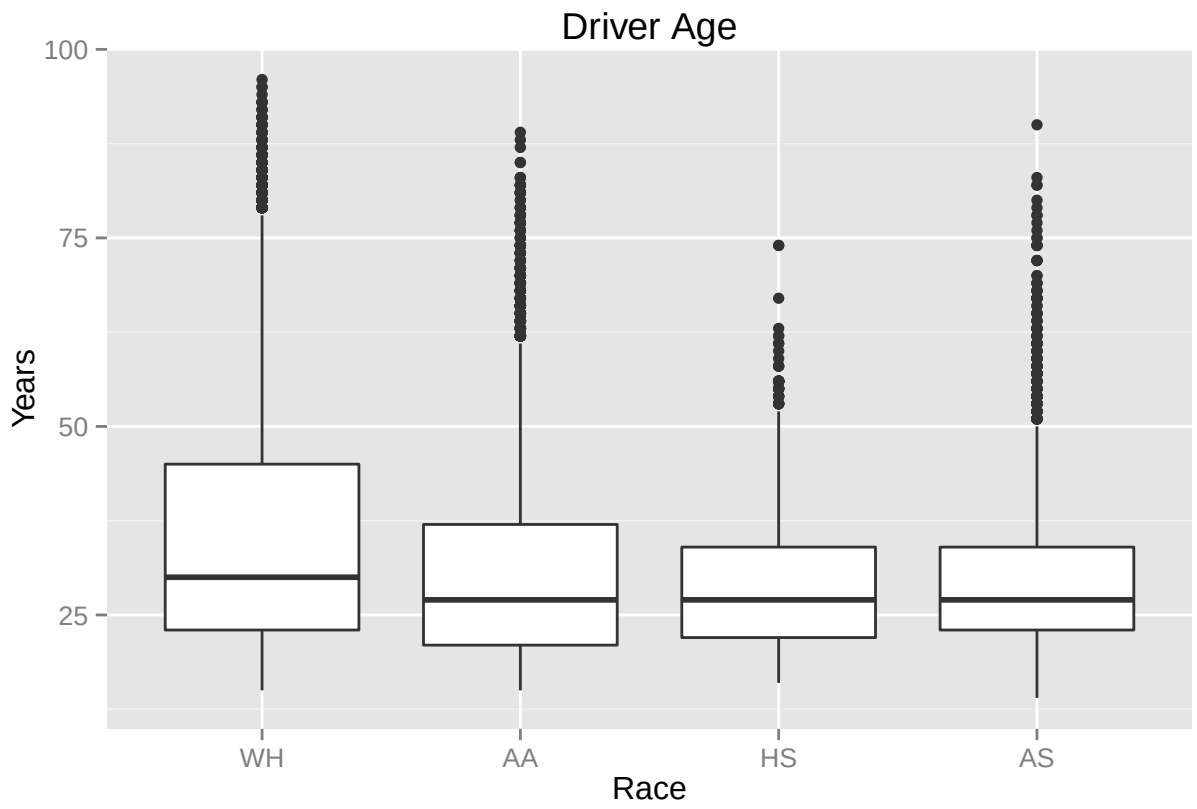


Figure 1: Distribution of Driver's Age by Race

Comments

There's greater variation in the age of white drivers, who also on average, tend to be slightly older than minority drivers.

Vehicle Age

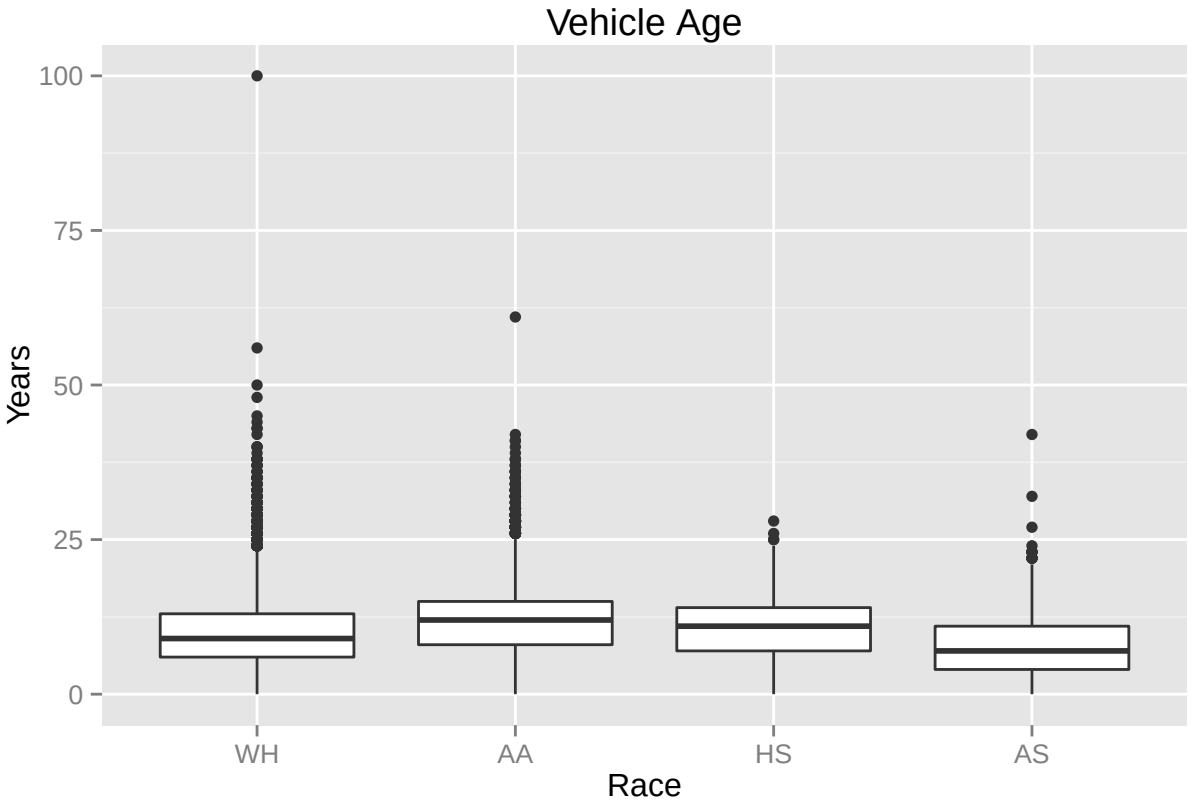


Figure 2: Distribution of Vehicle Age by Race

Comments

African Americans and Hispanics tend to drive slighltly older cars than Whites and Asians.

Gender

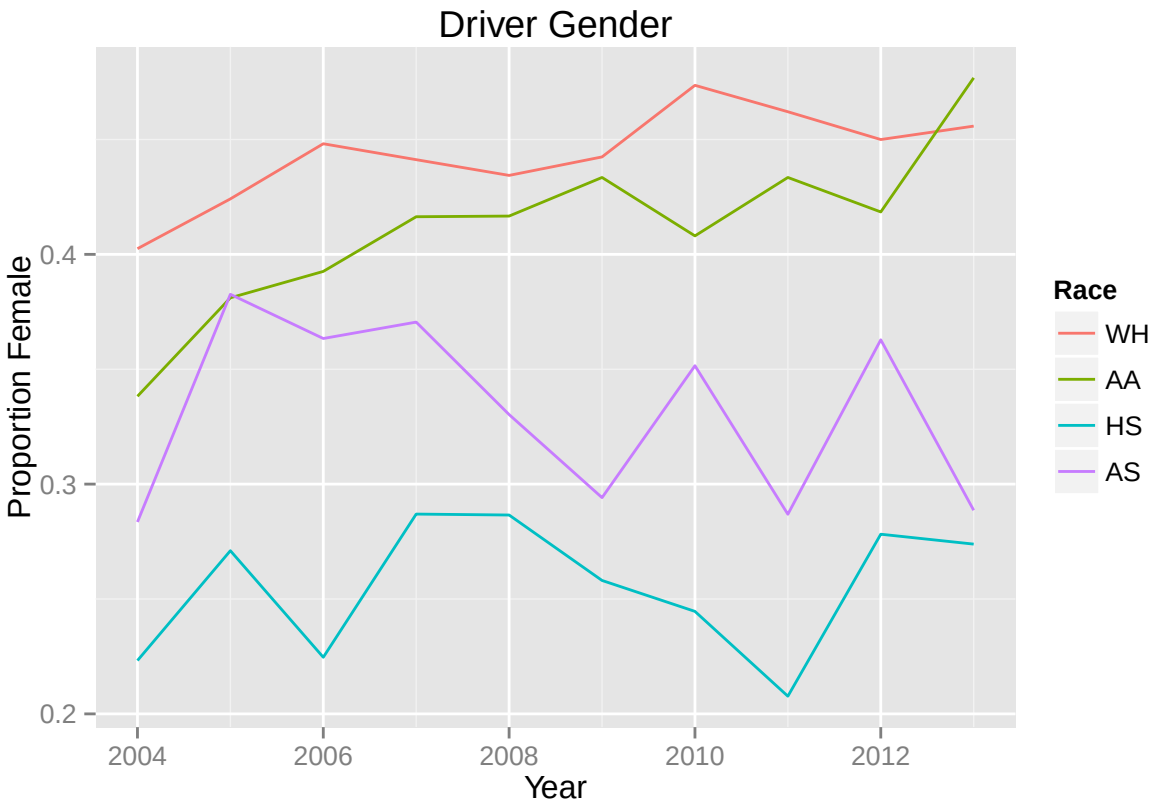


Figure 3: Proportion of Stopped Drivers who are Female

Comments

The figure shows the proportion of drivers stopped who are female for each racial group each year. For the most part, men are more likely to be stopped than women, particularly for Asians and Hispanics.

Traffic Stops and Patterns of Policing

Stops and Calls for Service

Calls for service 2010-2013

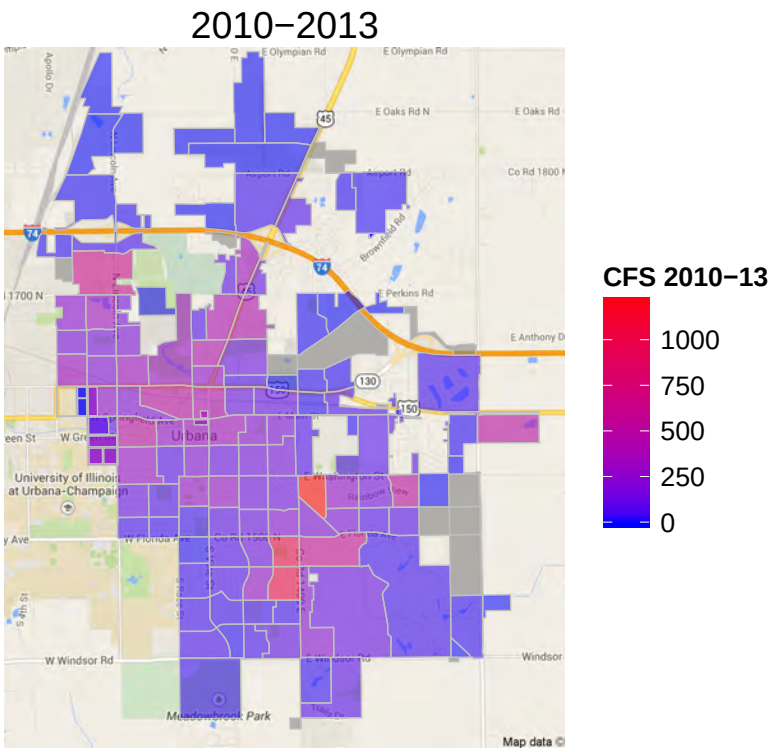


Figure 4: Total Calls for Service 2010-2013

Correlation between Calls for Service and Traffic Stops

Table 4: Correlations between CFS and Traffic Stops

	2010	**2011**	**2012**	**2013**	**2010-13**
Correlation	0.47	0.53	0.41	0.46	0.49

Table 5: Correlations between CFS and Minority Percent of Population

	2010	**2011**	**2012**	**2013**	**2010-13**
Correlation	0.30	0.33	0.29	0.29	0.31

Table 6: Correlations between CFS and Minority Percent of Population

	2010	**2011**	**2012**	**2013**	**2010-13**
Correlation	0.32	0.27	0.25	0.31	0.30

OLS Regressions of Stops on CFS and Minortiy population

The models below present the results from a series of regression analyses, examing how the total number of traffic stops in a police geocode varies accordding to the number of calls for service and the percentage of minorities that live in that geocode. The first set of models ignore the possibility for spatial dependence in the data which can bias the models estimates (i.e. that regions high or low values of our variables may cluster together). Statistical tests suggests there is spatial dependence in the data, and seem to a favor an autoregressive lag model.[7] Without controlling for spatial dependence, the minority population in the geocode is a larger positive predictor of the number of traffic stops in a region, when holding constant the number of calls for service. However, when the spatial dependence of the data is taken into account, the percent of minoirities living in an area is no longer a siginficant predictor of traffic stops.

Table 7

	Dependent variable:				
	TotStops	TotStops10	TotStops11	TotStops12	TotStops13
	(1)	(2)	(3)	(4)	(5)
TotCFS	0.250***				
	(0.056)				
crime2010		0.206***			
		(0.049)			
crime2011			0.194***		
			(0.038)		
crime2012				0.224***	
				(0.066)	
crime2013					0.348***
					(0.079)
Min.p	86.495**	22.731**	10.624	22.898*	32.782**
	(40.804)	(9.151)	(7.532)	(12.673)	(13.680)
pop	0.035	0.011	0.007	0.016	0.003
	(0.035)	(0.008)	(0.007)	(0.011)	(0.012)
Constant	27.335	4.936	7.655**	7.183	6.966
	(16.855)	(3.793)	(3.098)	(5.265)	(5.680)
Observations	138	138	138	138	138
R^2	0.268	0.267	0.298	0.202	0.244
Adjusted R^2	0.251	0.251	0.283	0.184	0.227
Residual Std. Error (df = 134)	107.202	24.133	19.651	33.500	36.159
F Statistic (df = 3; 134)	16.324***	16.302***	18.996***	11.293***	14.422***
Note:					*p<0.1; **p<0.05; ***p<0.01

[7] We also estimated autorgressive error models, and used a n-nearest neighbors weighting matrix. The results are substantively the same to those reported above.

Neighbor Matrix

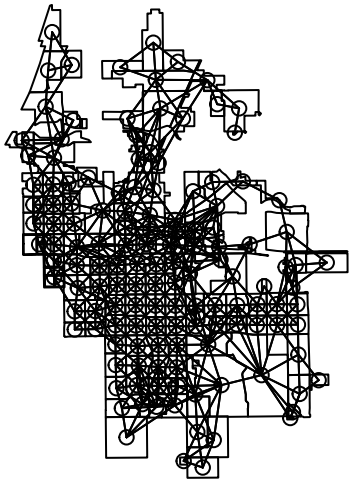


Table 8

	Dependent variable:				
	TotStops	TotStops10	TotStops11	TotStops12	TotStops13
	(1)	(2)	(3)	(4)	(5)
TotCFS	0.196***				
	(0.047)				
crime2010		0.175***			
		(0.041)			
crime2011			0.150***		
			(0.032)		
crime2012				0.169***	
				(0.058)	
crime2013					0.278***
					(0.069)
Min.p	27.400	7.395	3.178	8.045	13.278
	(35.002)	(7.842)	(6.397)	(11.253)	(12.099)
pop	0.005	0.005	0.001	0.008	−0.005
	(0.030)	(0.007)	(0.006)	(0.010)	(0.010)
Constant	1.900	−0.867	0.883	1.435	0.759
	(15.018)	(3.320)	(2.758)	(4.877)	(5.160)
Observations	138	138	138	138	138
Log Likelihood	−822.458	−616.065	−587.257	−666.629	−675.419
σ^2	8,232.247	412.572	271.271	871.020	987.938
Akaike Inf. Crit.	1,656.916	1,244.130	1,186.514	1,345.259	1,362.837
Wald Test (df = 1)	43.458***	46.260***	49.142***	30.576***	32.623***
LR Test (df = 1)	32.874***	34.102***	35.021***	23.495***	26.999***
Note:					*p<0.1; **p<0.05; ***p<0.01

Table 9

	Dependent variable:				
	TotStops	TotStops10	TotStops11	TotStops12	TotStops13
	(1)	(2)	(3)	(4)	(5)
TotCFS	0.217***				
	(0.049)				
crime2010		0.190***			
		(0.044)			
crime2011			0.164***		
			(0.034)		
crime2012				0.194***	
				(0.060)	
crime2013					0.298***
					(0.070)
Min.p	36.337	10.247	4.375	10.703	15.264
	(36.582)	(8.387)	(6.774)	(11.704)	(12.236)
pop	−0.007	0.003	−0.0003	0.006	−0.011
	(0.031)	(0.007)	(0.006)	(0.010)	(0.011)
Constant	2.627	−0.072	1.575	1.538	0.024
	(16.033)	(3.640)	(3.019)	(5.155)	(5.298)
Observations	138	138	138	138	138
Log Likelihood	−826.639	−622.712	−592.971	−670.086	−676.343
σ^2	8,937.304	468.077	302.843	934.684	1,008.693
Akaike Inf. Crit.	1,665.277	1,257.423	1,197.942	1,352.173	1,364.686
Wald Test (df = 1)	28.223***	22.917***	27.467***	17.897***	30.881***
LR Test (df = 1)	24.513***	20.808***	23.594***	16.581***	25.150***

Note: *p<0.1; **p<0.05; ***p<0.01

Stops and the STEPS program

Disparities are lower for STEP-stops relative to non-STEP stops

Table 10: Comparing Disparities in Steps vs Non-Steps Stops

	Est Pop %	STEPS	%	**STEPS Disp**	Non-STEPS	%	**Non-STEPS Disp**
White	63.14	588	65.33	**1.03**	1761	52.22	**0.83**
Black	17.39	195	21.67	**1.25**	1077	31.94	**1.84**
Hispanic	5.03	32	3.56	**0.71**	127	3.77	**0.75**
Asian	14.14	85	9.44	**0.67**	407	12.07	**0.85**
Minority	36.86	312	34.67	**0.94**	1611	47.78	**1.3**
Total		900	100		3372	0	

Disparities by Geographic Region

Working with data from the 2010 census, we've produced population estimates weighted by the census block for the racial composition of the 130+ police geocodes.[8]

Population estimates by Geocode

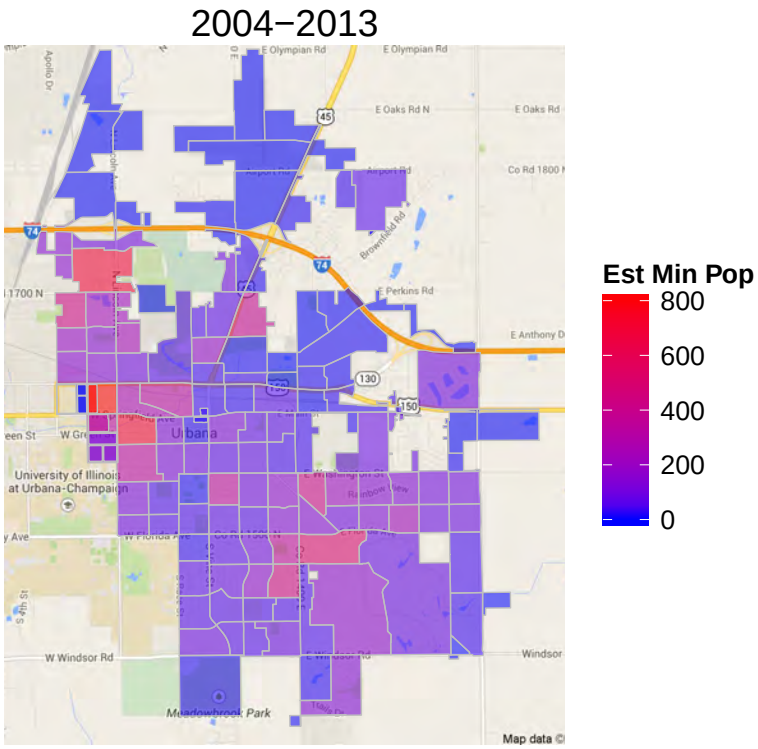


Figure 5: Estimated Minority Population

[8]Specifically, we overlayed the police geocode map onto the census block maps and then weighted populations for each block by the proportion of the blocks total area within the geocode. Consider a block with 10 people. If that block falls entirely within a geocode, all 10 are counted toward the estimated population of the geocode. If only half of the block falls within a geocode, that block would add 5 people to the estimate of the total population of that geocode.

Total Stops by Geocode

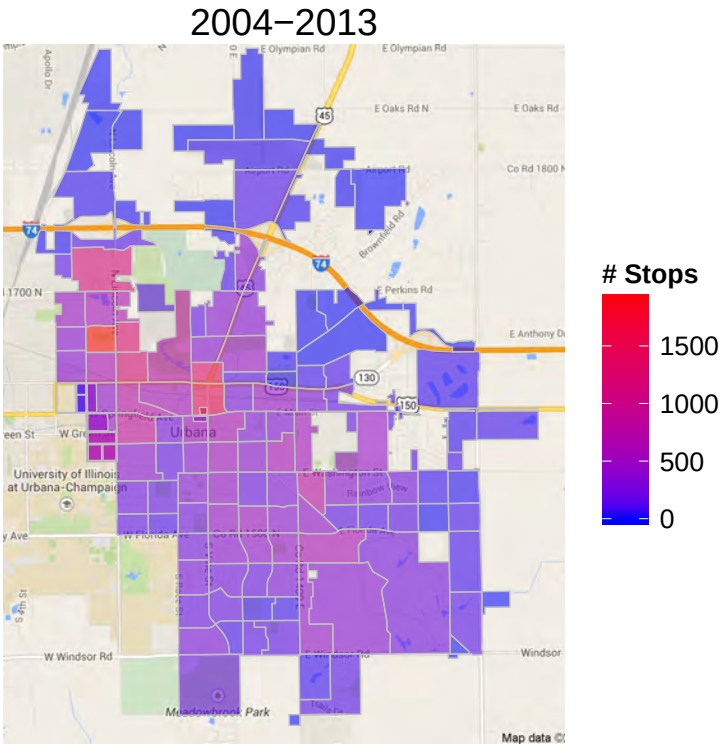


Figure 6: Estimated Minority Population

We can use information from the figures above to produce geocode-level measures of the IDOT disparity or relative risk of a minority being stopped based on the estimated minority population in each geocode. Spefically, for each geocode, i we calculate θ_i, a ratio of two proportions:

$$\theta_i = \frac{\frac{\text{Minority Stops}}{\text{Total Stops}}}{\frac{\text{Minority Population}}{\text{Total Population}}}$$

The figures below shows these estimates for each geocode, with blue being values below 1 (lower than expected risk of being stopped based on relative the proportion of minorities in the geocode's population), white being values close to 1 and red being values above 1 (more than expected risk). The same caveats about the IDOT measures apply to these, and note that when there few stops and/or small population in a geocode these estimates can be quite volatile.

Disparity Ratio 2004-2013

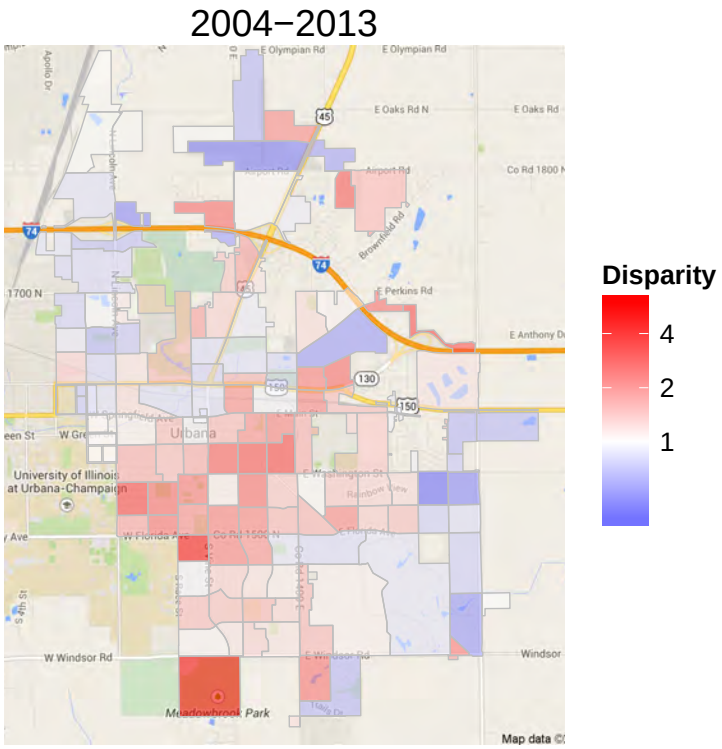


Figure 7: Disparty Ratio by Geocode

Recent Years: 2011-2013

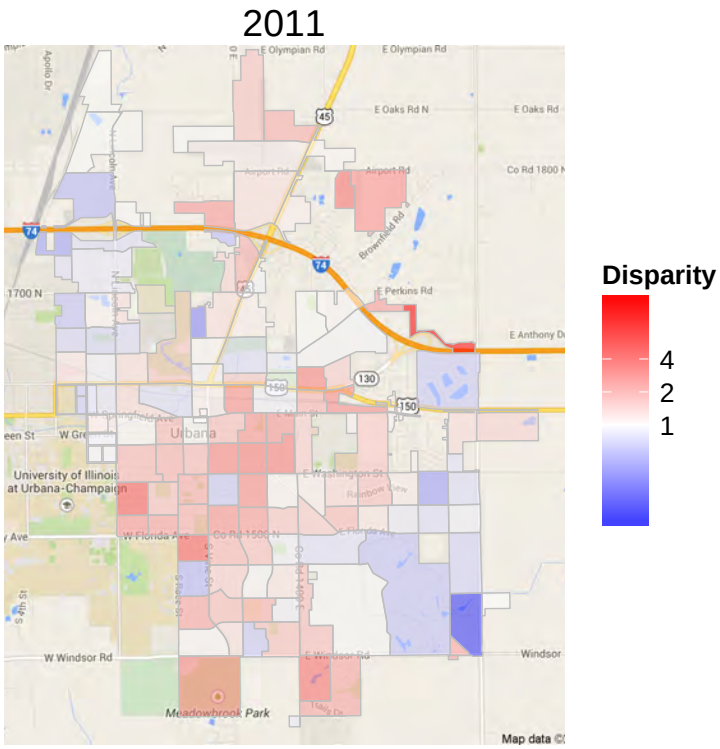


Figure 8: 2011 Disparty Ratio by Geocode

Only statistically significant disparties

To capture this volatility, we also constructed confidence intervals for the point estimates, that reflect the uncertainty of estimates where their are relatively few stops or small populations. The figures below shows the geocodes with $\theta > 1$ (i.e. more than expected risk) whose 95-percent confidence intervals do not include 1.

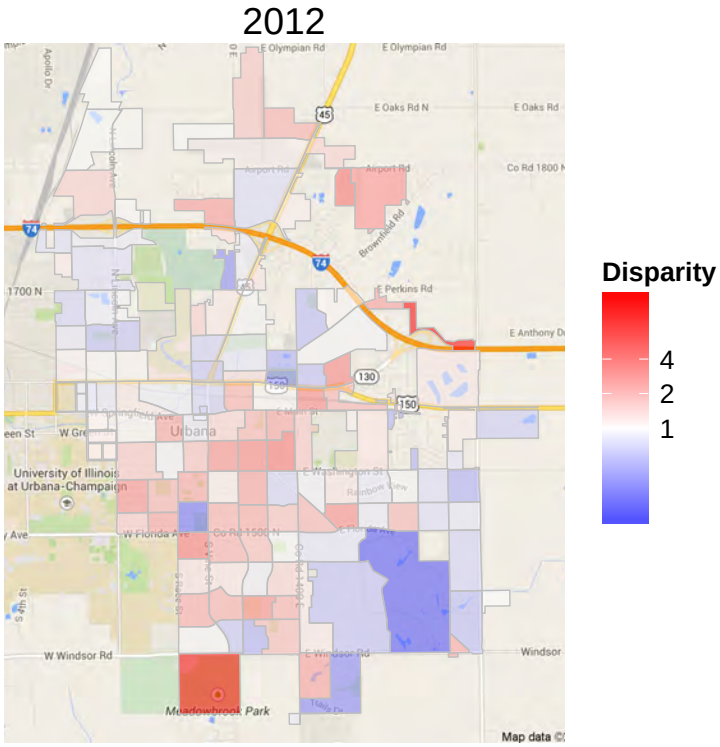


Figure 9: 2012 Disparty Ratio by Geocode

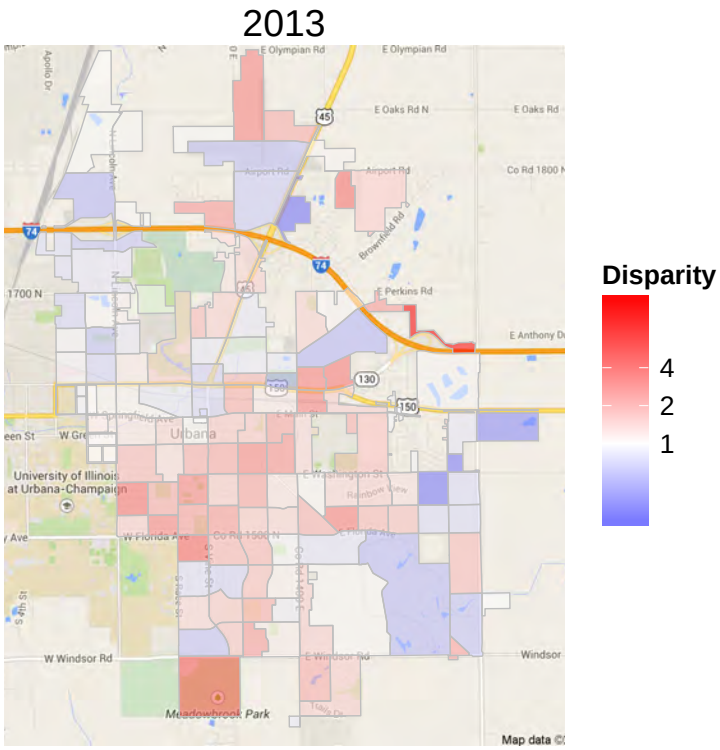


Figure 10: 2013 Disparty Ratio by Geocode

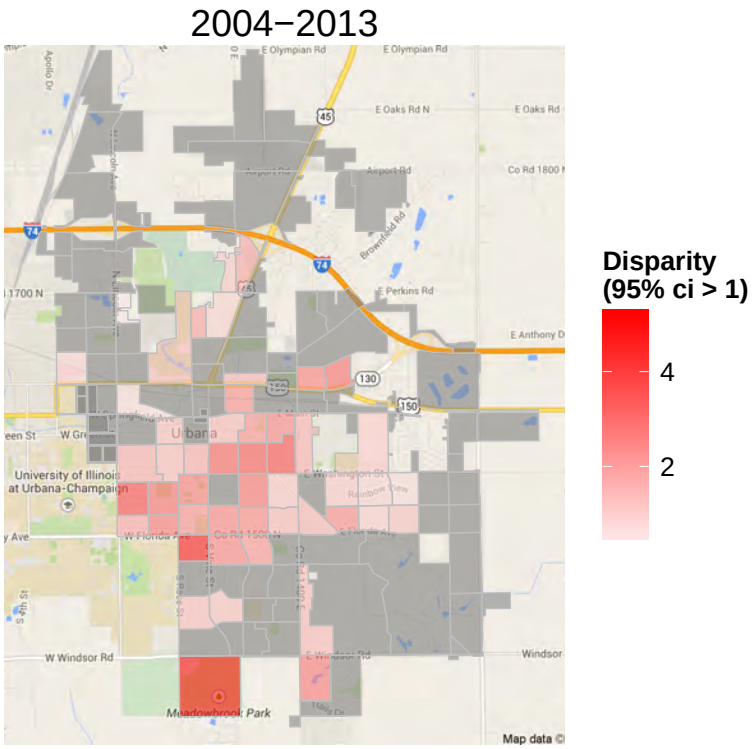


Figure 11: Statistically Significant Disparties by Geocode

Recent Years: 2011-2013 (Only statistically significant disparties)

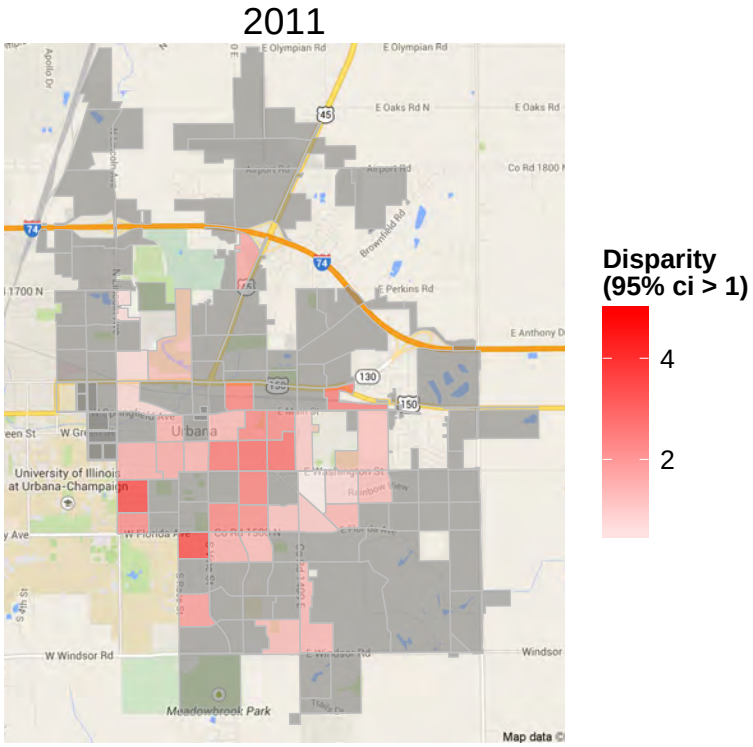


Figure 12: 2011 Disparty Ratio by Geocode

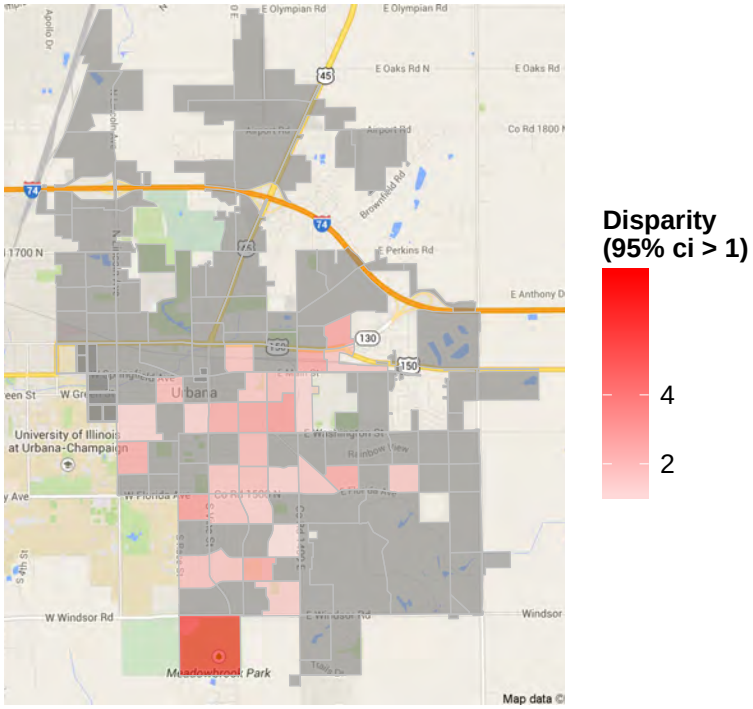


Figure 13: 2012 Disparty Ratio by Geocode

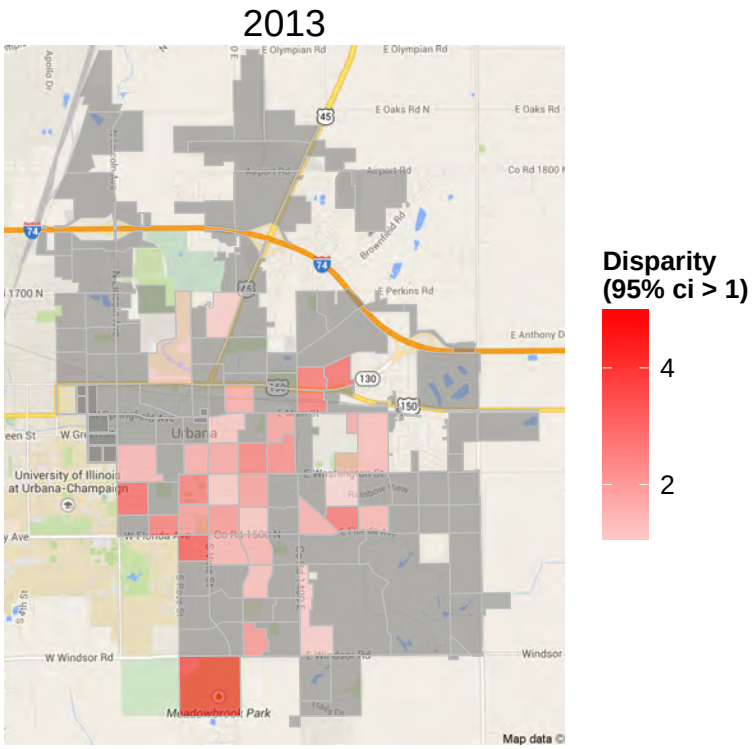


Figure 14: 2013 Disparty Ratio by Geocode

Testing for Racial Profiling Using the Veil of Darkness

Models

	No Time of Day	Linear Effect	Cubic Spline	Interaction	Year FE
Dark Out	0.12*	−0.13	−0.12	−0.97	−0.93
	(0.06)	(0.07)	(0.07)	(0.51)	(0.51)
Time of Day		0.00***			
		(0.00)			
Spline(Time of Day) 1			0.27	0.19	0.19
			(0.21)	(0.25)	(0.25)
Spline(Time of Day) 2			0.74*	0.42	0.42
			(0.34)	(0.45)	(0.45)
Spline(Time of Day) 3			0.88***	1.12***	1.12***
			(0.22)	(0.31)	(0.31)
Spline(Time of Day) 4			0.78***	0.32	0.35
			(0.18)	(0.34)	(0.34)
Spline(Time of Day) 5			1.30**	0.98	0.96
			(0.40)	(0.51)	(0.51)
Spline(Time of Day) 6			0.54**	0.63	0.56
			(0.17)	(0.48)	(0.49)
Time of Day X Spline(Time of Day) 1				0.72	0.67
				(0.53)	(0.53)
Time of Day X Spline(Time of Day) 2				1.20	1.22
				(0.81)	(0.81)
Time of Day X Spline(Time of Day) 3				0.30	0.25
				(0.58)	(0.58)
Time of Day X Spline(Time of Day) 4				1.05*	0.98*
				(0.50)	(0.50)
Time of Day X Spline(Time of Day) 5				1.90	1.90
				(1.16)	(1.16)
Time of Day X Spline(Time of Day) 6				0.01	0.08
				(0.53)	(0.54)
AIC	5991.48	5940.06	5945.93	5951.22	5948.63
BIC	6004.24	5959.19	5996.95	6040.52	6095.33
Log Likelihood	-2993.74	-2967.03	-2964.96	-2961.61	-2951.32
Deviance	5987.48	5934.06	5929.93	5923.22	5902.63
Num. obs.	4351	4351	4351	4351	4351

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

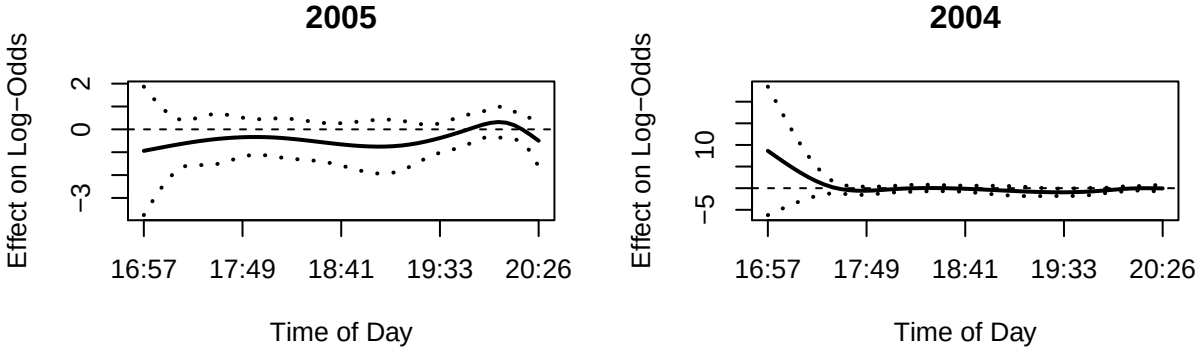
Table 11: Testing for Racial Profiling of Minorities

Yearly Estimates of Racial Profiling of Minorities with Log-Odds

	No Time of Day	Linear Effect	Cubic Spline	Interaction	Year FE
Dark Out	0.15*	−0.11	−0.10	−1.02	−0.92
	(0.06)	(0.07)	(0.07)	(0.56)	(0.56)
Time of Day		0.00***			
		(0.00)			
Spline(Time of Day) 1			−0.04	−0.11	−0.09
			(0.22)	(0.27)	(0.27)
Spline(Time of Day) 2			0.72*	0.41	0.34
			(0.36)	(0.47)	(0.48)
Spline(Time of Day) 3			0.83***	1.15***	1.18***
			(0.23)	(0.31)	(0.32)
Spline(Time of Day) 4			0.62**	0.06	0.06
			(0.19)	(0.36)	(0.36)
Spline(Time of Day) 5			0.94*	0.43	0.41
			(0.43)	(0.54)	(0.54)
Spline(Time of Day) 6			0.52**	0.52	0.48
			(0.18)	(0.50)	(0.50)
Time of Day X Spline(Time of Day) 1				0.71	0.57
				(0.58)	(0.58)
Time of Day X Spline(Time of Day) 2				1.19	1.21
				(0.87)	(0.87)
Time of Day X Spline(Time of Day) 3				0.23	0.10
				(0.63)	(0.63)
Time of Day X Spline(Time of Day) 4				1.21*	1.11*
				(0.53)	(0.53)
Time of Day X Spline(Time of Day) 5				2.32	2.23
				(1.28)	(1.27)
Time of Day X Spline(Time of Day) 6				0.05	0.06
				(0.55)	(0.56)
AIC	5564.53	5512.76	5513.80	5515.47	5506.23
BIC	5577.29	5531.89	5564.83	5604.76	5652.93
Log Likelihood	-2780.27	-2753.38	-2748.90	-2743.73	-2730.12
Deviance	5560.53	5506.76	5497.80	5487.47	5460.23
Num. obs.	4351	4351	4351	4351	4351

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 12: Testing for Racial Profiling of African Americans



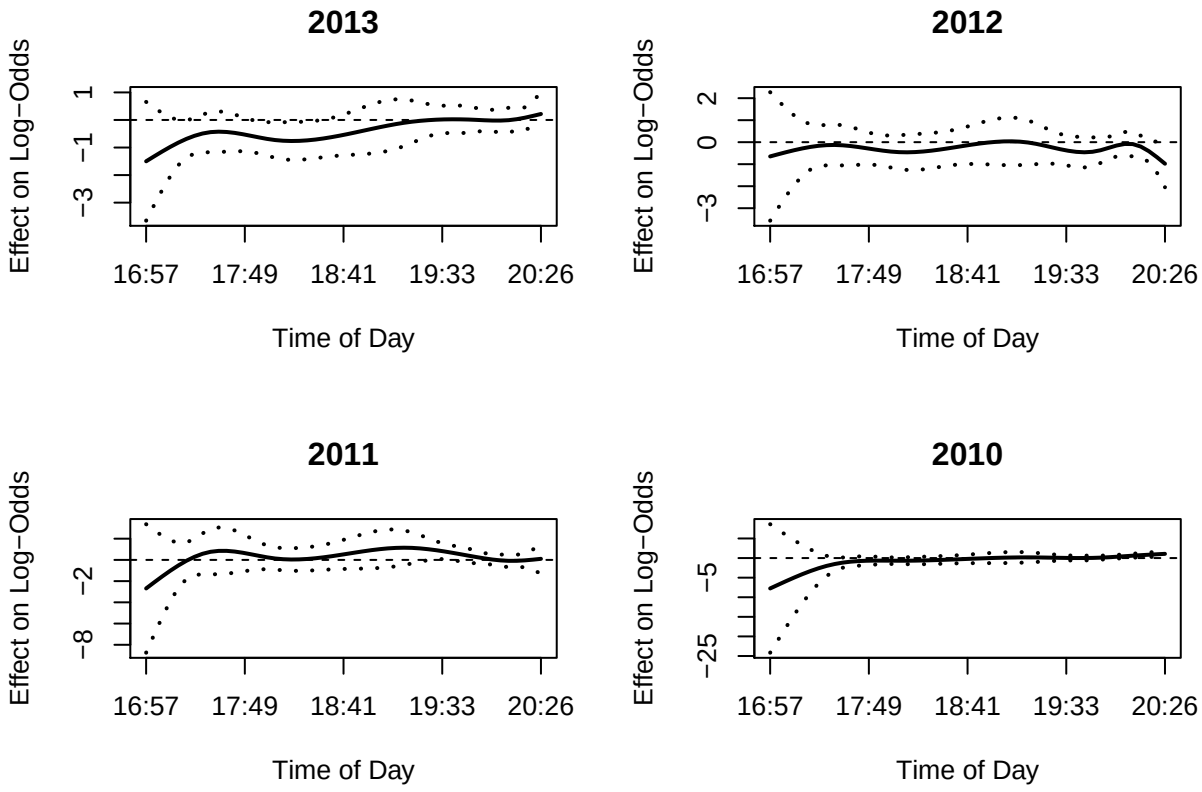


Figure 15: Yearly Estimates of Racial Profiling of Minorities (2000-13)

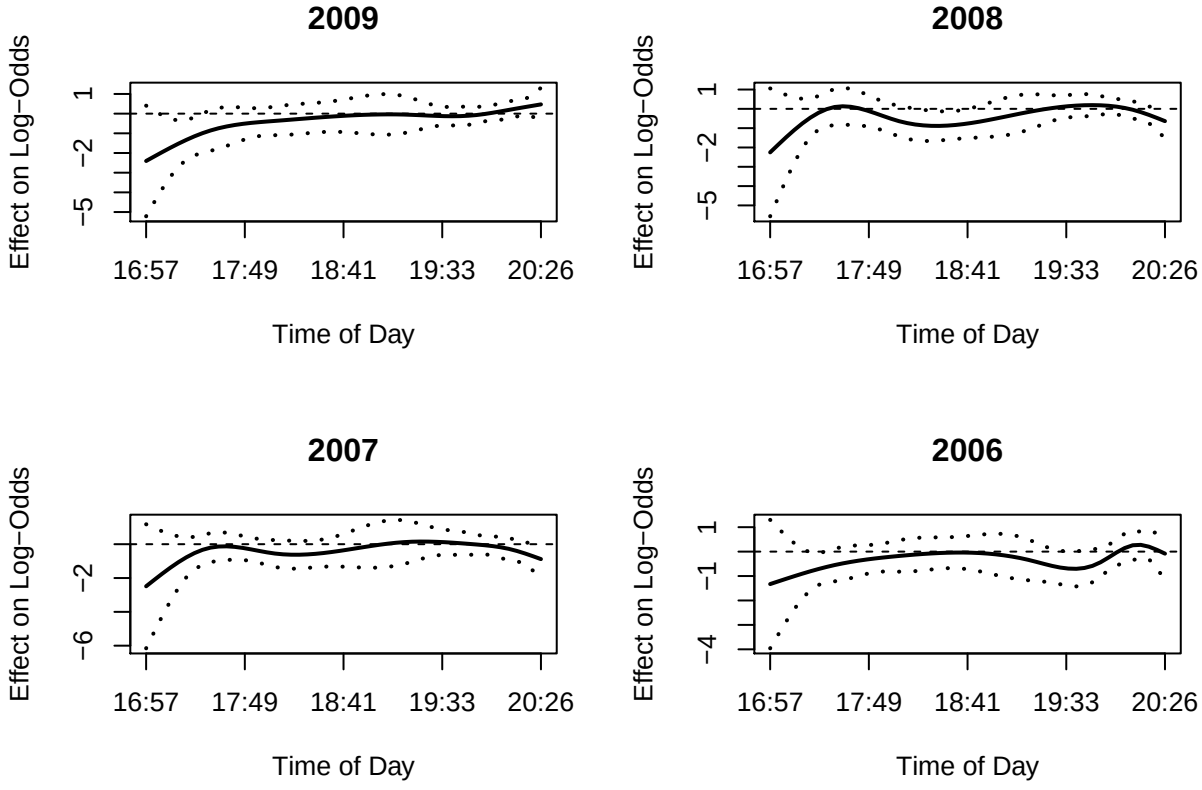


Figure 16: Yearly Estimates of Racial Profiling of Minorities (2006-09)

	No Time of Day	Linear Effect	Cubic Spline	Interaction	Year FE
Dark Out	0.15*	−0.13	−0.12	−1.06	−0.98
	(0.07)	(0.08)	(0.08)	(0.56)	(0.56)
Time of Day		0.00***			
		(0.00)			
Spline(Time of Day) 1			0.07	−0.00	0.01
			(0.23)	(0.28)	(0.28)
Spline(Time of Day) 2			0.81*	0.46	0.38
			(0.37)	(0.49)	(0.49)
Spline(Time of Day) 3			0.92***	1.23***	1.27***
			(0.24)	(0.33)	(0.33)
Spline(Time of Day) 4			0.76***	0.19	0.18
			(0.20)	(0.37)	(0.37)
Spline(Time of Day) 5			1.18**	0.70	0.66
			(0.44)	(0.56)	(0.56)
Spline(Time of Day) 6			0.58**	0.62	0.57
			(0.18)	(0.52)	(0.52)
Time of Day X Spline(Time of Day) 1				0.74	0.61
				(0.59)	(0.59)
Time of Day X Spline(Time of Day) 2				1.27	1.33
				(0.89)	(0.89)
Time of Day X Spline(Time of Day) 3				0.25	0.14
				(0.64)	(0.64)
Time of Day X Spline(Time of Day) 4				1.23*	1.14*
				(0.54)	(0.54)
Time of Day X Spline(Time of Day) 5				2.29	2.24
				(1.29)	(1.29)
Time of Day X Spline(Time of Day) 6				0.03	0.05
				(0.57)	(0.57)
AIC	5123.67	5066.12	5069.45	5072.35	5065.71
BIC	5136.18	5084.89	5119.51	5159.95	5209.63
Log Likelihood	-2559.83	-2530.06	-2526.73	-2522.18	-2509.86
Deviance	5119.67	5060.12	5053.45	5044.35	5019.71
Num. obs.	3855	3855	3855	3855	3855

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 13: Testing for Racial Profiling of African Americans (Other Minorities Excluded)

Yearly Estimates of Racial Profiling of African Americans with Log-Odds

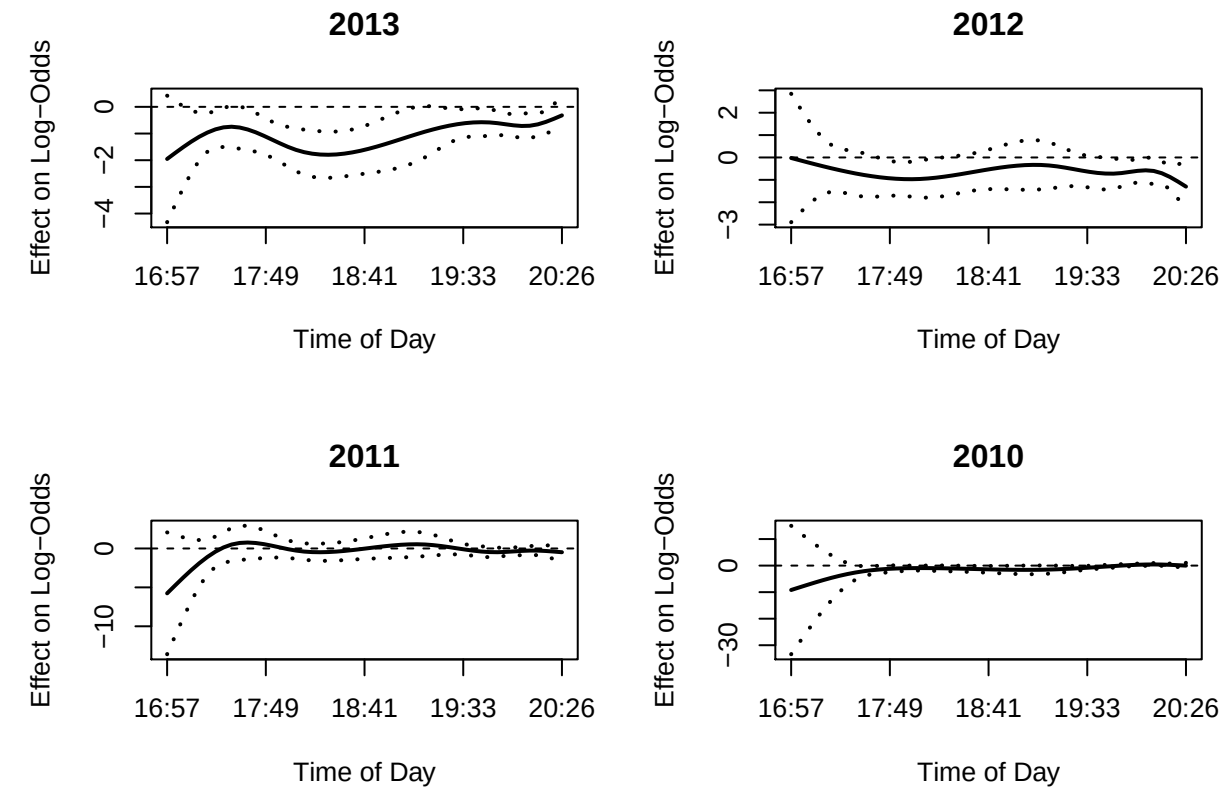
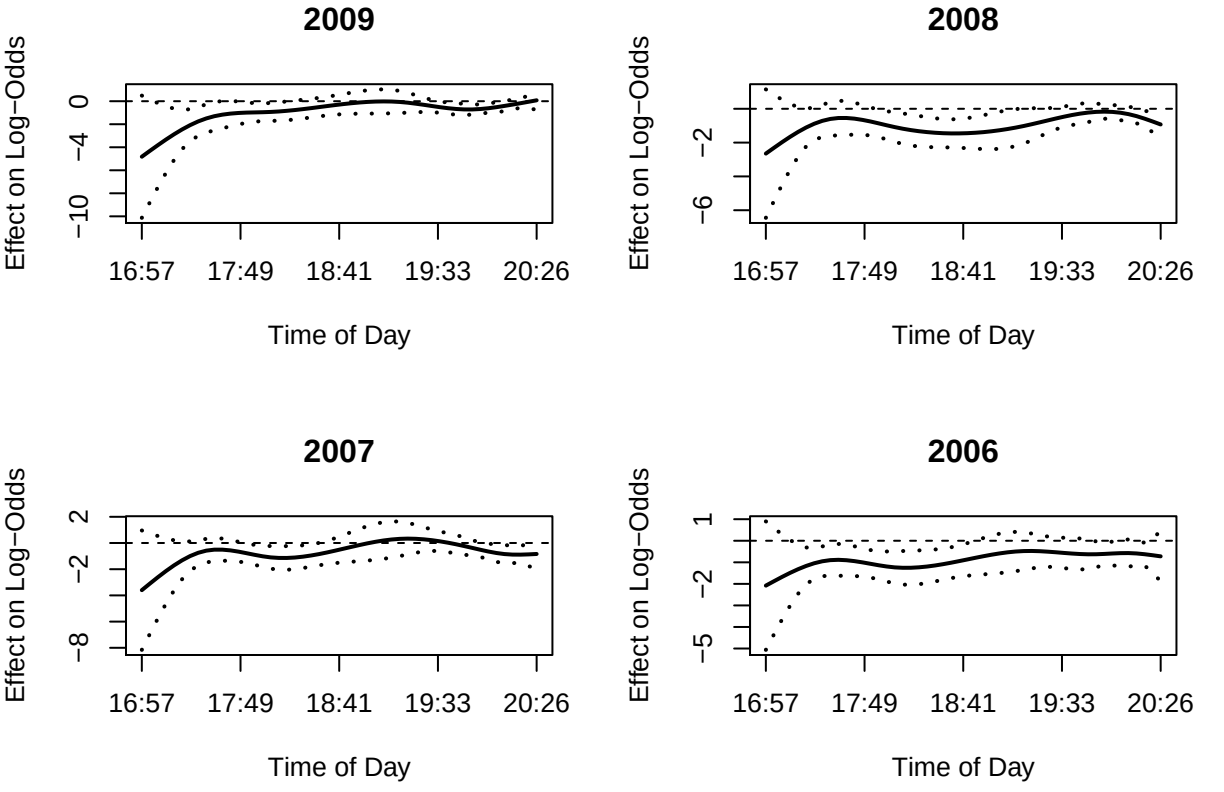


Figure 17: Yearly Estimates of Racial Profiling of African Americans(2000-13)



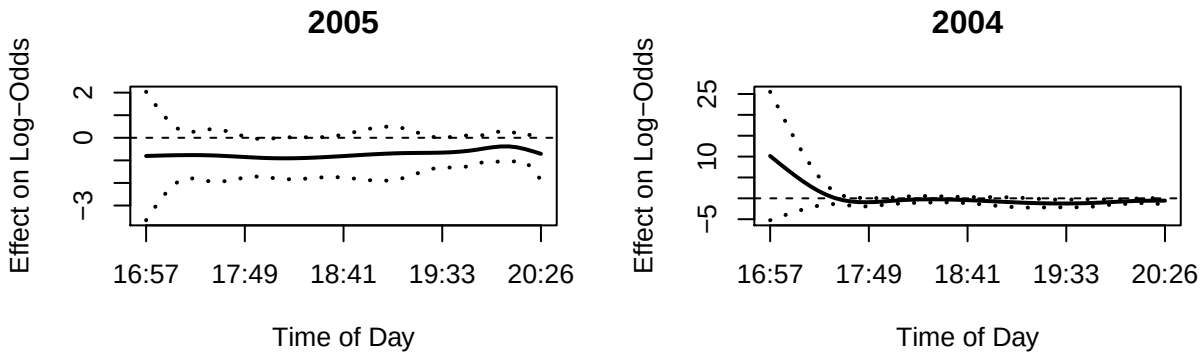


Figure 18: Yearly Estimates of Racial Profiling of African Americans (2004-06)

Yearly Estimates of Racial Profiling of African Americans with Log-Odds (Excluding Other Minoriities from Analysis)

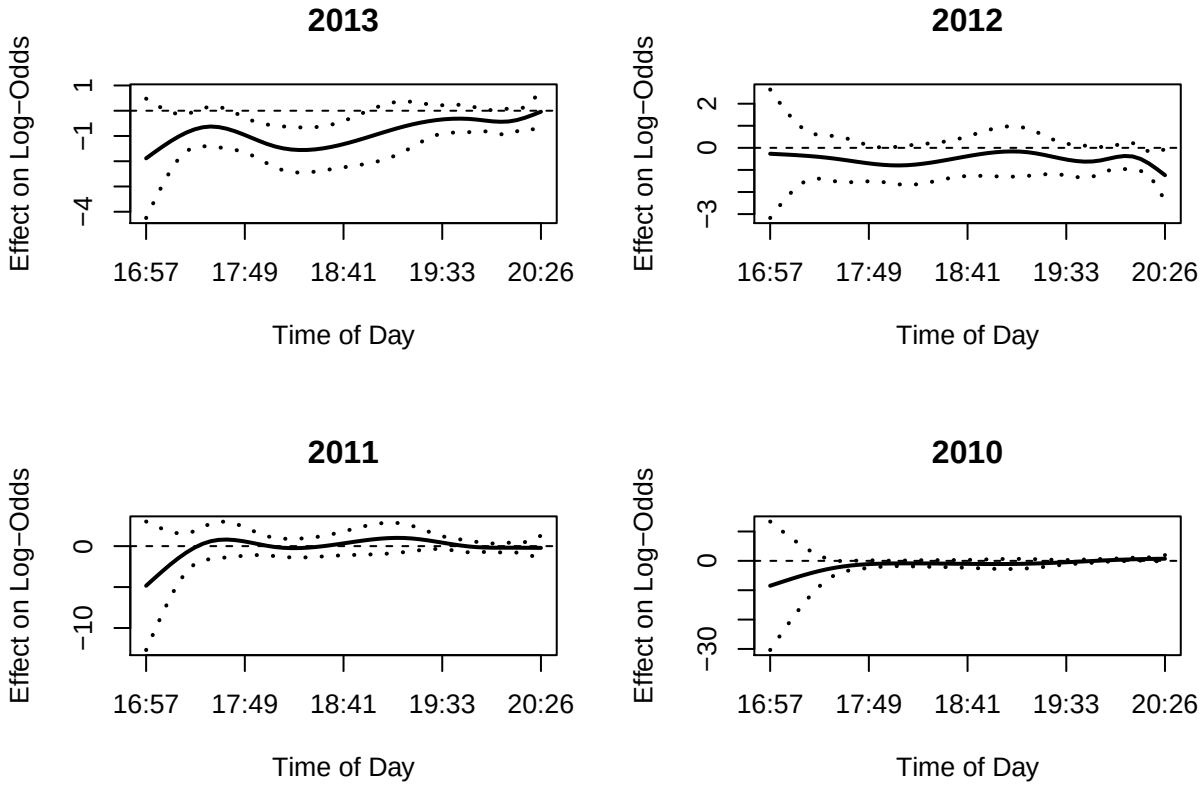
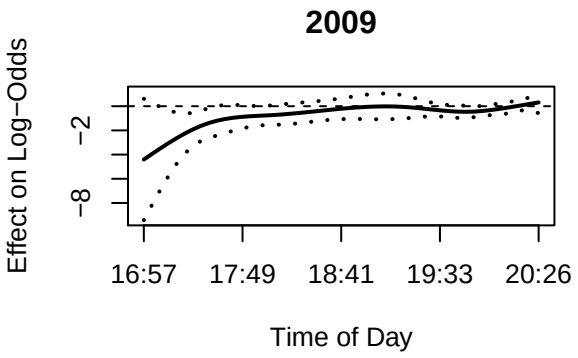
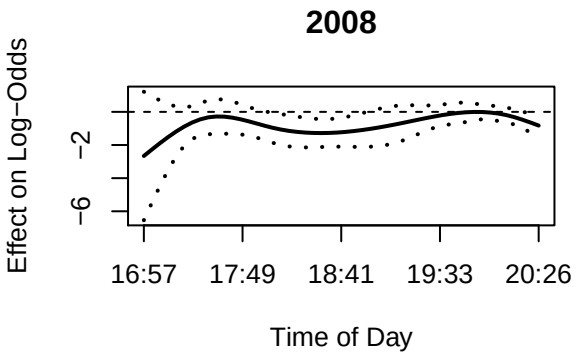
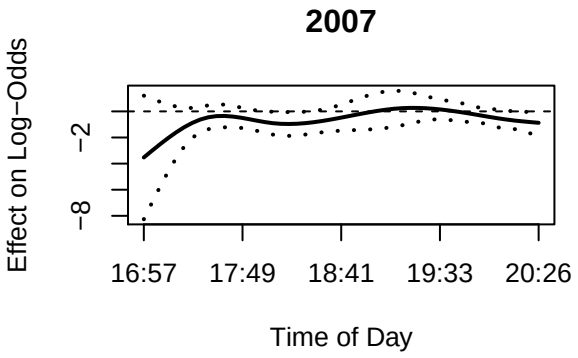
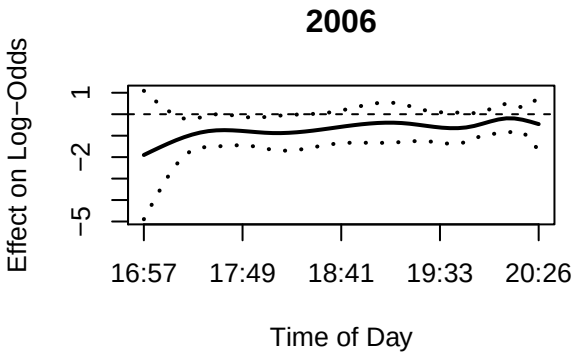


Figure 19: Yearly Estimates of Racial Profiling of African Americans(2000-13)


2009
Effect on Log−Odds
−8
−2
16:57
17:49
18:41
19:33
20:26
Time of Day


2008
Effect on Log−Odds
−6
−2
16:57
17:49
18:41
19:33
20:26
Time of Day


2007
Effect on Log−Odds
−8
−2
16:57
17:49
18:41
19:33
20:26
Time of Day


2006
Effect on Log−Odds
−5
−2
1
16:57
17:49
18:41
19:33
20:26
Time of Day

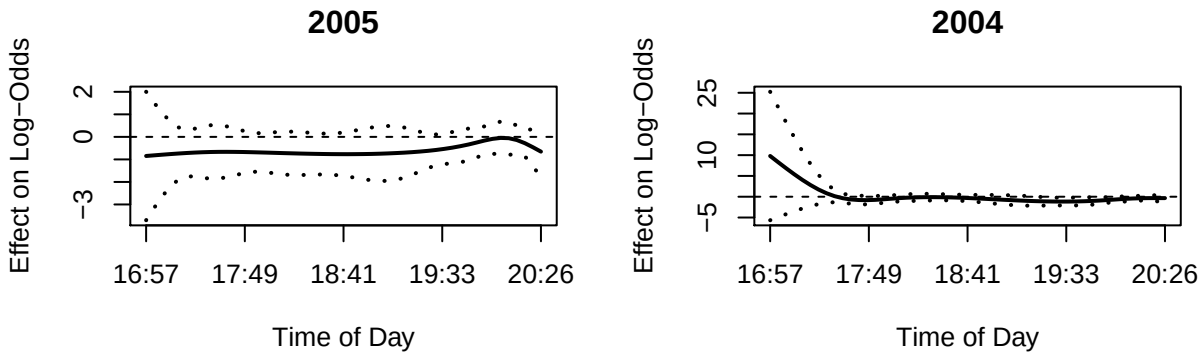


Figure 20: Yearly Estimates of Racial Profiling of African Americans (2004-06)

Disparities in Financial Impact

Merging IDOT Data with Court Data

To obtain estimates of the financial impact of traffic stops, we merged data on driver's race from the IDOT data with the Champaign County Court data on traffic citations from 2004 to 2014 using the driver's first and last names.There are a total of 40,868 charges, with 26,389 unique defendants, with some defendants receiving multiple charges. Overall, we were able to match 77 percent of the court records with the IDOT data. In a given year, we are able to match between 15 and 20 percent of the cases, while in 2014, 58 percent of the cases are unknown (labeled "UK" below). Since there are only 13 respondents who identify as Native American or Alaskan, they are excluded from subsquent analyis.

Table 14: Defendants by Race (2004-2013)

	AA	AS	HS	NA	WH	UK
Count	6184	1968	988	13	11060	6176
Proportion	0.23	0.07	0.04	0	0.42	0.23

Average Fine by Race

In the sample, the average fine paid by a person in given case, (for which there may be multiple charges) is about $186.68. The median fine is $77 dollars. The distribution of fines is very skewed. About 22 percent of the sample pay no fine, while 6 percent of the sample pay over $600 in fines.

Looking at the distribution of fines by race, we see that African Americans and Hispancis, on average, are ordered to pay more fines than Whites and Asians. There are several possible reasons for this disparity, each of which we explore in more detail below.

Table 15: Average Fines by Race (2004-2014)

Race	Average Fine	Stnd Dev	50th percentile	75 percentile	Maximum
AA	204.03	516.39	77	164.0	16235
AS	154.50	386.01	120	122.0	12191
HS	295.38	607.29	120	300.0	7593
WH	171.60	388.80	77	121.0	7614
UK	186.72	449.85	115	156.0	17442

Types of Charges by Race

First, the distribution of charges may vary across racial groups. African Americans and Hispanics, may be more likely to be charged with offenses that carry a higher fine. The table below provides some evidence of this. Driving without insurance or on a revoked license carry higher average fines than moving violations, and are more common among African Americans and Hispancis, than Whites and Asians.

Table 16: Top 10 Charges by Race (2004-2014)

White	**Count**	**Mean Fine**
Driving 15-20 Mph Above Limit	2411	$108.25
Operate Uninsured Mtr Vehicle	2125	$100.75
Driving 11-14 Mph Above Limit	2003	$104.17
Disregard Stop Sign	1702	$101.5
Seat Belt Required/driver	717	$52.92
Disreg Traffic Control Light	636	$100.05
Fail To Reduce Speed	578	$112.03
Driving On Suspended License	464	$238.34
Driving 1-10 Mph Above Limit	423	$102.64
Drvg Under Influ Of Alcohol	421	$790.87
African American	**Count**	**Mean Fine**
Operate Uninsured Mtr Vehicle	2503	$186.67
Driving On Suspended License	1121	$209.82
Driving 15-20 Mph Above Limit	969	$92.81
Unlicensed	893	$171.87
Driving 11-14 Mph Above Limit	828	$92.08
Disregard Stop Sign	760	$82.17
Op Veh W/loud System >75 Ft	452	$65.89
Driving On Revoked License	426	$90.45
Seat Belt Required/driver	333	$44.06
Fail To Reduce Speed	297	$83.53
Hispanic	**Count**	**Mean Fine**
Unlicensed	475	$172.02
Operate Uninsured Mtr Vehicle	394	$295.78
Driving 15-20 Mph Above Limit	136	$104.56
Disregard Stop Sign	118	$86.19
Driving 11-14 Mph Above Limit	103	$90.55
Driving On Suspended License	94	$311.28
Drvg Under Influ Of Alcohol	61	$244.93
Improper Traffic Lane Usage	43	$73.86
Disreg Traffic Control Light	41	$88.05
Drvg Under Influ/bac 0.08	41	$179.44
Asian	**Count**	**Mean Fine**
Driving 15-20 Mph Above Limit	528	$107.06
Driving 11-14 Mph Above Limit	317	$105.95
Operate Uninsured Mtr Vehicle	303	$70.73
Disregard Stop Sign	298	$100.96
Disreg Traffic Control Light	160	$107.03
Unlicensed	97	$49.93
Unsafe Equipment/1st and 2nd	90	$243.19
Fail To Reduce Speed	84	$135.35
Driving 21-25 Mph Above Limit	70	$120.86
Improper Traffic Lane Usage	55	$107.73

Number of Charges by Race

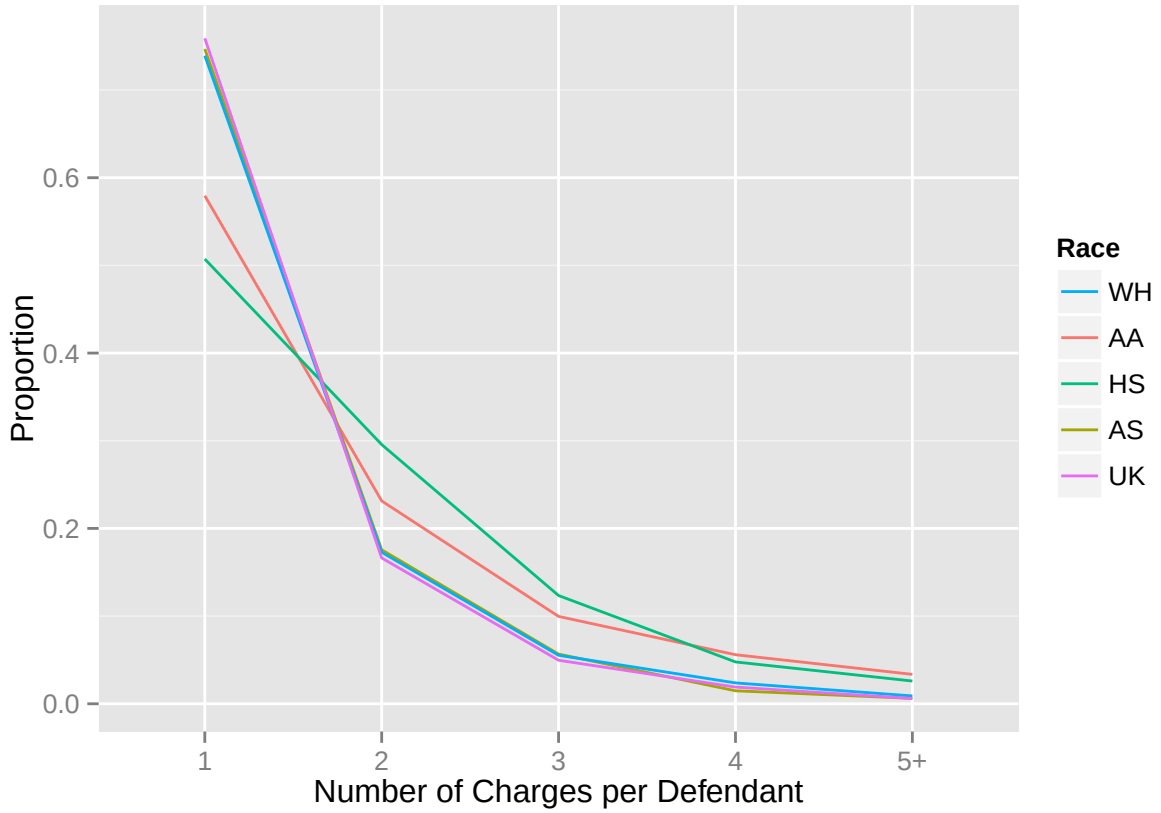
Second, members of different racial groups may be more or less likely to be charged with multiple offenses (e.g. speeding and driving without insurance), which would raise the average fine per person in these groups. Again, the data support this view. Fourty-two percent of African Americans and 49 percent of Hispanics are charged with more than one violation, compared to 25 percent of Asians and 26 percent of Whites. Individuals with one charge, pay between $100 and $130 dollars in fines. Those charged with more than one fine pay about $300 to $400 dollars more

Table 17: Number of Charges by Race (2004-2014)

	One	Two	Three	Four	Five +
AA	3489	1393	600	337	202
AS	1463	344	111	29	12
HS	489	285	119	46	25
WH	8103	1894	606	261	98
UK	4664	1022	305	117	37

Table 18: Proportion of Multipe Charges by Race (2004-2014)

	One	Two	Three	Four	Five +
AA	0.58	0.23	0.10	0.06	0.03
AS	0.75	0.18	0.06	0.01	0.01
HS	0.51	0.30	0.12	0.05	0.03
WH	0.74	0.17	0.06	0.02	0.01
UK	0.76	0.17	0.05	0.02	0.01


Proportion
0.6
0.4
0.2
0.0
1
2
3
4
5+
Number of Charges per Defendant
Race
WH
AA
HS
AS
UK

Average Fine by Violation and Race

Finally, it is possible, that for the same offense, different minorty groups recieve different fines. The evidence here is mixed. African Americans and Hispancis are significantly more likely to pay higher fines for driving without insurance and being unlicensed. Whites pay more for moving violations and DUIs compared to African Americans and Hispanics, but not Asians. Asians are fined more for traffic lane violations

‘‘‘

Table 19: Differences in Average Fines for Selected Charges by Race (2004-2014)

White-African American	**Mean WH Fine**	**Mean AA Fine**	**Difference**
Driving 15-20 Mph Above Limit	108.25	92.81	-15.44*
Driving 11-14 Mph Above Limit	104.17	92.08	-12.09*
Seat Belt Required/driver	52.92	44.06	-8.86*
Disregard Stop Sign	101.5	82.17	-19.32*
Improper Traffic Lane Usage	65.49	63.65	-1.84
Operate Uninsured Mtr Vehicle	100.75	186.67	85.92*
Unlicensed	90.32	171.87	81.56*
Driving On Suspended License	238.34	209.82	-28.53
Driving On Revoked License	121.9	90.45	-31.45
Drvg Under Influ Of Alcohol	790.87	439.77	-351.11*
White-Hispanic	**Mean WH Fine**	**Mean HS Fine**	**Difference**
Driving 15-20 Mph Above Limit	108.25	104.56	-3.69
Driving 11-14 Mph Above Limit	104.17	90.55	-13.62*
Seat Belt Required/driver	52.92	34.71	-18.21*
Disregard Stop Sign	101.5	86.19	-15.31*
Improper Traffic Lane Usage	65.49	73.86	8.37
Operate Uninsured Mtr Vehicle	100.75	295.78	195.03*
Unlicensed	90.32	172.02	81.7*
Driving On Suspended License	238.34	311.28	72.93
Driving On Revoked License	121.9	185.12	63.21
Drvg Under Influ Of Alcohol	790.87	244.93	-545.94*
White-Asian	**Mean WH Fine**	**Mean AS Fine**	**Difference**
Driving 15-20 Mph Above Limit	108.25	107.06	-1.19
Driving 11-14 Mph Above Limit	104.17	105.95	1.78
Seat Belt Required/driver	52.92	50.93	-2
Disregard Stop Sign	101.5	100.96	-0.54
Improper Traffic Lane Usage	65.49	107.73	42.24*
Operate Uninsured Mtr Vehicle	100.75	70.73	-30.03
Unlicensed	90.32	49.93	-40.39*
Driving On Suspended License	238.34	252.15	13.8
Driving On Revoked License	121.9	175.8	53.9
Drvg Under Influ Of Alcohol	790.87	952.8	161.93

Note:*p < 0.05

Appendix

Complete Summary of Stops, Citations, Searches, and Contraband by Race

Type of Stop

Total Stops

Figure 21: Total Number of Stops by Year and Race

The figure shows the total number of stops by year and type of stop for each racial group.

Comments

- Moving violations are the most common reason for stop, followed by equipment violations, and stops for License plates/Registration (L/R)
- Increase in total stops peaks at 2009, driven by rises in the number of equipment and L/R stops.
- Increase from 2011-2013 reflects increase across all type of stops.
- White and African American drivers make up the majority of stops.

Percent of Total Stops

Figure 22: Proportion of Yearly Stops by Race

The figure shows for a given year and type of stop, what proportion of the stops are from what racial group. - The proportion of total stops by race is relatively constant over the years. - Whites and African Americans account for generally over 90 percent of all stops - Whites make up the majority of moving violations - African Americans account for the plurality of Equipment and L/R stops

Type of Stop by Race

The figure shows the proportion of each racial group's total stops that are for moving violations, equipment, and L/R.

Comments

- Moving violations are the most common type of stop for all races
- Equipment and L/R stops tend to be more common among African Americans and Hispanics

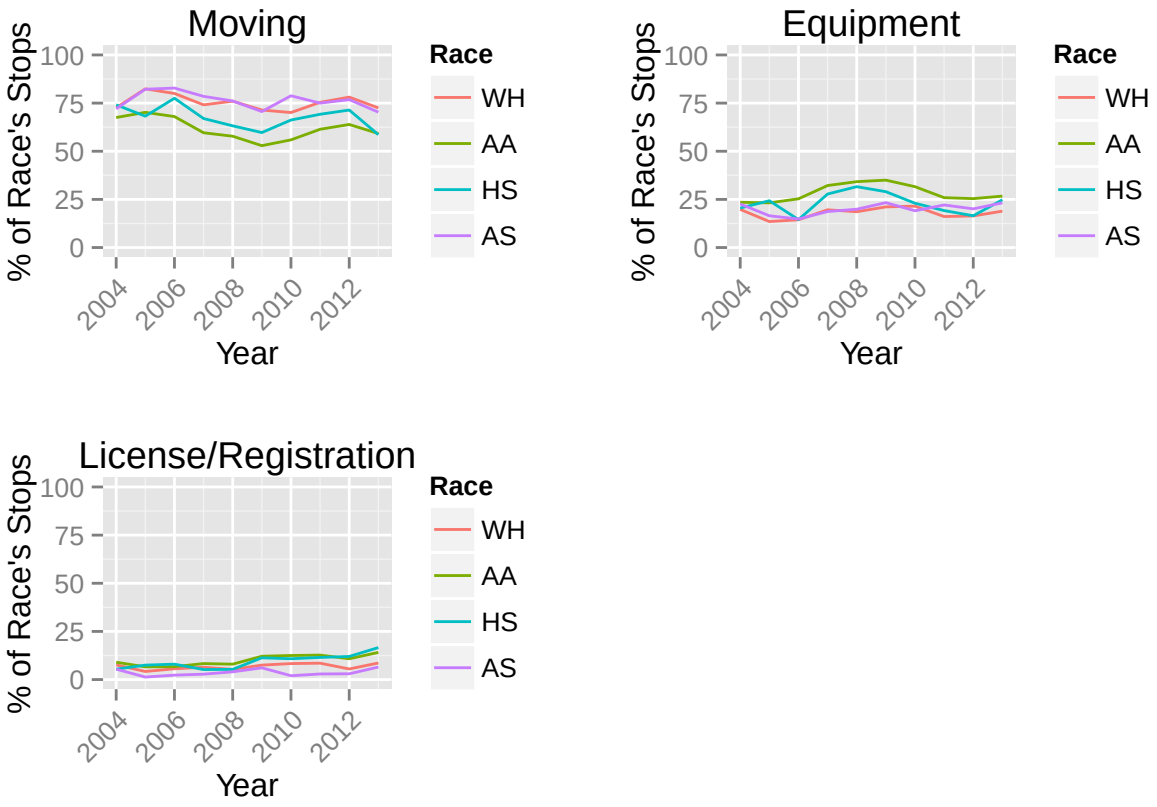


Figure 23: Type of Stop by Race and Year

Table 20: Traffic Stops by Race

		WH		**AA**		**HS**		**AS**	
	Total	#	%	#	%	#	%	#	%
2004	3548	1948	**54.9**	1227	**34.6**	112	**3.2**	261	**7.4**
2005	3049	1707	**56**	1005	**33**	107	**3.5**	230	**7.5**
2006	4014	2131	**53.1**	1401	**34.9**	138	**3.4**	344	**8.6**
2007	3380	1854	**54.9**	1160	**34.3**	115	**3.4**	251	**7.4**
2008	4024	2194	**54.5**	1332	**33.1**	171	**4.2**	327	**8.1**
2009	4275	2240	**52.4**	1458	**34.1**	186	**4.4**	391	**9.1**
2010	3077	1476	**48**	1169	**38**	139	**4.5**	293	**9.5**
2011	2829	1463	**51.7**	992	**35.1**	130	**4.6**	244	**8.6**
2012	3746	2169	**57.9**	1116	**29.8**	133	**3.6**	328	**8.8**
2013	4287	2365	**55.2**	1273	**29.7**	157	**3.7**	492	**11.5**

Table 21: Moving Violations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	2514	1415	**56.3**	828	**32.9**	83	**3.3**	188	**7.5**
2005	2374	1406	**59.2**	706	**29.7**	73	**3.1**	189	**8**
2006	3049	1704	**55.9**	953	**31.3**	107	**3.5**	285	**9.3**
2007	2338	1373	**58.7**	691	**29.6**	77	**3.3**	197	**8.4**
2008	2795	1668	**59.7**	770	**27.5**	108	**3.9**	249	**8.9**
2009	2758	1600	**58**	771	**28**	111	**4**	276	**10**
2010	2012	1035	**51.4**	654	**32.5**	92	**4.6**	231	**11.5**
2011	1985	1103	**55.6**	609	**30.7**	90	**4.5**	183	**9.2**
2012	2754	1694	**61.5**	713	**25.9**	95	**3.4**	252	**9.2**
2013	2906	1715	**59**	753	**25.9**	92	**3.2**	346	**11.9**

Table 22: License and Registration Violations By Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	279	148	**53**	111	**39.8**	6	**2.2**	14	**5**
2005	148	71	**48**	66	**44.6**	8	**5.4**	3	**2**
2006	233	120	**51.5**	94	**40.3**	11	**4.7**	8	**3.4**
2007	227	118	**52**	96	**42.3**	6	**2.6**	7	**3.1**
2008	245	117	**47.8**	106	**43.3**	9	**3.7**	13	**5.3**
2009	389	167	**42.9**	177	**45.5**	21	**5.4**	24	**6.2**
2010	290	123	**42.4**	146	**50.3**	15	**5.2**	6	**2.1**
2011	273	125	**45.8**	126	**46.2**	15	**5.5**	7	**2.6**
2012	265	119	**44.9**	120	**45.3**	16	**6**	10	**3.8**
2013	442	204	**46.2**	180	**40.7**	26	**5.9**	32	**7.2**

Table 23: Equipment Violations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	755	385	**51**	288	**38.1**	23	**3**	59	**7.8**
2005	527	230	**43.6**	233	**44.2**	26	**4.9**	38	**7.2**
2006	732	307	**41.9**	354	**48.4**	20	**2.7**	51	**7**
2007	815	363	**44.5**	373	**45.8**	32	**3.9**	47	**5.8**
2008	984	409	**41.6**	456	**46.3**	54	**5.5**	65	**6.6**
2009	1128	473	**41.9**	510	**45.2**	54	**4.8**	91	**8.1**
2010	775	318	**41**	369	**47.6**	32	**4.1**	56	**7.2**
2011	571	235	**41.2**	257	**45**	25	**4.4**	54	**9.5**
2012	727	356	**49**	283	**38.9**	22	**3**	66	**9.1**
2013	939	446	**47.5**	340	**36.2**	39	**4.2**	114	**12.1**

Citations

Total Number of Citations

Figure 24: Total Number of Citations by Year, Race, and Type of Stop

The figure shows total number of citations issued in a given year to drivers of a certain race.

Figure 25: Proportion of Total Citations by Year, Race, and Type of Stop

The figure shows the proportion of total citations in a year issued to each racial group for all stops, and then separately for moving, equipment and L/R violations.

Comments

- Gaps between Whites and African American Drivers in terms of citations for Equipment and L/R stops

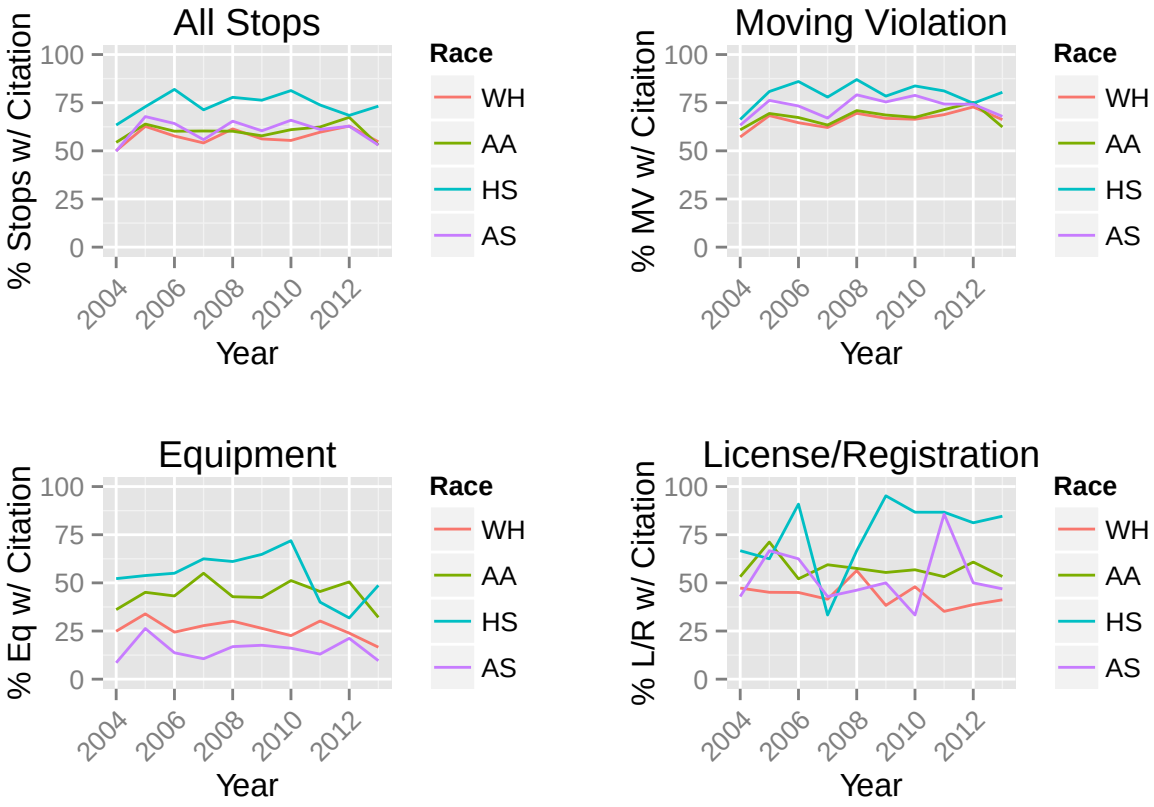


Figure 26: Rates of Citations by Year, Race, and Type of Stop

The figure shows the rates of stops which result in citations for each racial group.

Comments

- Hispanics are far more likely to get a citation, particularly for L/R stops.

Table 24: Citations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	1948	975	**52.9**	667	**36.2**	71	**3.9**	130	**7.1**
2005	1707	1070	**55**	642	**33**	78	**4**	156	**8**
2006	2131	1229	**51.1**	843	**35**	113	**4.7**	221	**9.2**
2007	1854	1003	**52.1**	700	**36.4**	82	**4.3**	140	**7.3**
2008	2194	1348	**54**	802	**32.1**	133	**5.3**	214	**8.6**
2009	2240	1260	**50.8**	843	**34**	142	**5.7**	236	**9.5**
2010	1476	818	**44.5**	713	**38.8**	113	**6.2**	193	**10.5**
2011	1463	874	**50.3**	619	**35.6**	96	**5.5**	149	**8.6**
2012	2169	1365	**56.5**	752	**31.2**	91	**3.8**	206	**8.5**
2013	2365	1293	**55.2**	675	**28.8**	115	**4.9**	261	**11.1**

Table 25: Moving Violation Citations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	1487	809	**54.4**	504	**33.9**	55	**3.7**	119	**8**
2005	1653	960	**58.1**	490	**29.6**	59	**3.6**	144	**8.7**
2006	2042	1100	**53.9**	641	**31.4**	92	**4.5**	209	**10.2**
2007	1483	853	**57.5**	438	**29.5**	60	**4**	132	**8.9**
2008	1996	1159	**58.1**	546	**27.4**	94	**4.7**	197	**9.9**
2009	1895	1071	**56.5**	529	**27.9**	87	**4.6**	208	**11**
2010	1387	687	**49.5**	441	**31.8**	77	**5.6**	182	**13.1**
2011	1403	759	**54.1**	435	**31**	73	**5.2**	136	**9.7**
2012	2028	1234	**60.8**	536	**26.4**	71	**3.5**	187	**9.2**
2013	1914	1135	**59.3**	470	**24.6**	74	**3.9**	235	**12.3**

Table 26: Lic/Reg Citations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	139	70	**50.4**	59	**42.4**	4	**2.9**	6	**4.3**
2005	86	32	**37.2**	47	**54.7**	5	**5.8**	2	**2.3**
2006	118	54	**45.8**	49	**41.5**	10	**8.5**	5	**4.2**
2007	111	49	**44.1**	57	**51.4**	2	**1.8**	3	**2.7**
2008	139	66	**47.5**	61	**43.9**	6	**4.3**	6	**4.3**
2009	194	64	**33**	98	**50.5**	20	**10.3**	12	**6.2**
2010	157	59	**37.6**	83	**52.9**	13	**8.3**	2	**1.3**
2011	130	44	**33.8**	67	**51.5**	13	**10**	6	**4.6**
2012	137	46	**33.6**	73	**53.3**	13	**9.5**	5	**3.6**
2013	217	84	**38.7**	96	**44.2**	22	**10.1**	15	**6.9**

Table 27: Equipment Citations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	217	96	**44.2**	104	**47.9**	12	**5.5**	5	**2.3**
2005	207	78	**37.7**	105	**50.7**	14	**6.8**	10	**4.8**
2006	246	75	**30.5**	153	**62.2**	11	**4.5**	7	**2.8**
2007	331	101	**30.5**	205	**61.9**	20	**6**	5	**1.5**
2008	362	123	**34**	195	**53.9**	33	**9.1**	11	**3**
2009	392	125	**31.9**	216	**55.1**	35	**8.9**	16	**4.1**
2010	293	72	**24.6**	189	**64.5**	23	**7.8**	9	**3.1**
2011	205	71	**34.6**	117	**57.1**	10	**4.9**	7	**3.4**
2012	249	85	**34.1**	143	**57.4**	7	**2.8**	14	**5.6**
2013	213	74	**34.7**	109	**51.2**	19	**8.9**	11	**5.2**

Table 28: Percent of Stops with Citations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	1948	975	**50.1**	1227	667	**54.4**	112	71	**63.4**	261	130	**49.8**
2005	1707	1070	**62.7**	1005	642	**63.9**	107	78	**72.9**	230	156	**67.8**
2006	2131	1229	**57.7**	1401	843	**60.2**	138	113	**81.9**	344	221	**64.2**
2007	1854	1003	**54.1**	1160	700	**60.3**	115	82	**71.3**	251	140	**55.8**
2008	2194	1348	**61.4**	1332	802	**60.2**	171	133	**77.8**	327	214	**65.4**
2009	2240	1260	**56.2**	1458	843	**57.8**	186	142	**76.3**	391	236	**60.4**
2010	1476	818	**55.4**	1169	713	**61**	139	113	**81.3**	293	193	**65.9**
2011	1463	874	**59.7**	992	619	**62.4**	130	96	**73.8**	244	149	**61.1**
2012	2169	1365	**62.9**	1116	752	**67.4**	133	91	**68.4**	328	206	**62.8**
2013	2365	1293	**54.7**	1273	675	**53**	157	115	**73.2**	492	261	**53**

Table 29: Percent of Stops with Citations for Moving Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	1415	809	**57.2**	828	504	**60.9**	83	55	**66.3**	188	119	**63.3**
2005	1406	960	**68.3**	706	490	**69.4**	73	59	**80.8**	189	144	**76.2**
2006	1704	1100	**64.6**	953	641	**67.3**	107	92	**86**	285	209	**73.3**
2007	1373	853	**62.1**	691	438	**63.4**	77	60	**77.9**	197	132	**67**
2008	1668	1159	**69.5**	770	546	**70.9**	108	94	**87**	249	197	**79.1**
2009	1600	1071	**66.9**	771	529	**68.6**	111	87	**78.4**	276	208	**75.4**
2010	1035	687	**66.4**	654	441	**67.4**	92	77	**83.7**	231	182	**78.8**
2011	1103	759	**68.8**	609	435	**71.4**	90	73	**81.1**	183	136	**74.3**
2012	1694	1234	**72.8**	713	536	**75.2**	95	71	**74.7**	252	187	**74.2**
2013	1715	1135	**66.2**	753	470	**62.4**	92	74	**80.4**	346	235	**67.9**

Table 30: Percent of Stops with Citations for Lic/Reg Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	148	70	**47.3**	111	59	**53.2**	6	4	**66.7**	14	6	**42.9**
2005	71	32	**45.1**	66	47	**71.2**	8	5	**62.5**	3	2	**66.7**
2006	120	54	**45**	94	49	**52.1**	11	10	**90.9**	8	5	**62.5**
2007	118	49	**41.5**	96	57	**59.4**	6	2	**33.3**	7	3	**42.9**
2008	117	66	**56.4**	106	61	**57.5**	9	6	**66.7**	13	6	**46.2**
2009	167	64	**38.3**	177	98	**55.4**	21	20	**95.2**	24	12	**50**
2010	123	59	**48**	146	83	**56.8**	15	13	**86.7**	6	2	**33.3**
2011	125	44	**35.2**	126	67	**53.2**	15	13	**86.7**	7	6	**85.7**
2012	119	46	**38.7**	120	73	**60.8**	16	13	**81.2**	10	5	**50**
2013	204	84	**41.2**	180	96	**53.3**	26	22	**84.6**	32	15	**46.9**

Table 31: Percent of Stops with Citations for Equipment Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	385	96	**24.9**	288	104	**36.1**	23	12	**52.2**	59	5	**8.5**
2005	230	78	**33.9**	233	105	**45.1**	26	14	**53.8**	38	10	**26.3**
2006	307	75	**24.4**	354	153	**43.2**	20	11	**55**	51	7	**13.7**
2007	363	101	**27.8**	373	205	**55**	32	20	**62.5**	47	5	**10.6**
2008	409	123	**30.1**	456	195	**42.8**	54	33	**61.1**	65	11	**16.9**
2009	473	125	**26.4**	510	216	**42.4**	54	35	**64.8**	91	16	**17.6**
2010	318	72	**22.6**	369	189	**51.2**	32	23	**71.9**	56	9	**16.1**
2011	235	71	**30.2**	257	117	**45.5**	25	10	**40**	54	7	**13**
2012	356	85	**23.9**	283	143	**50.5**	22	7	**31.8**	66	14	**21.2**
2013	446	74	**16.6**	340	109	**32.1**	39	19	**48.7**	114	11	**9.6**

Searches

Total Number of Searches

Figure 27: Total Number of Searches by Year, Race, and Type of Stop

The figure shows the overall number of stops in year by racial group.

Comments

- Overall, it seems the number of searches has been declining.
- The format for reporting searches are reported in the data frequently changed over 2004-2012.

Propotion of Total Searches

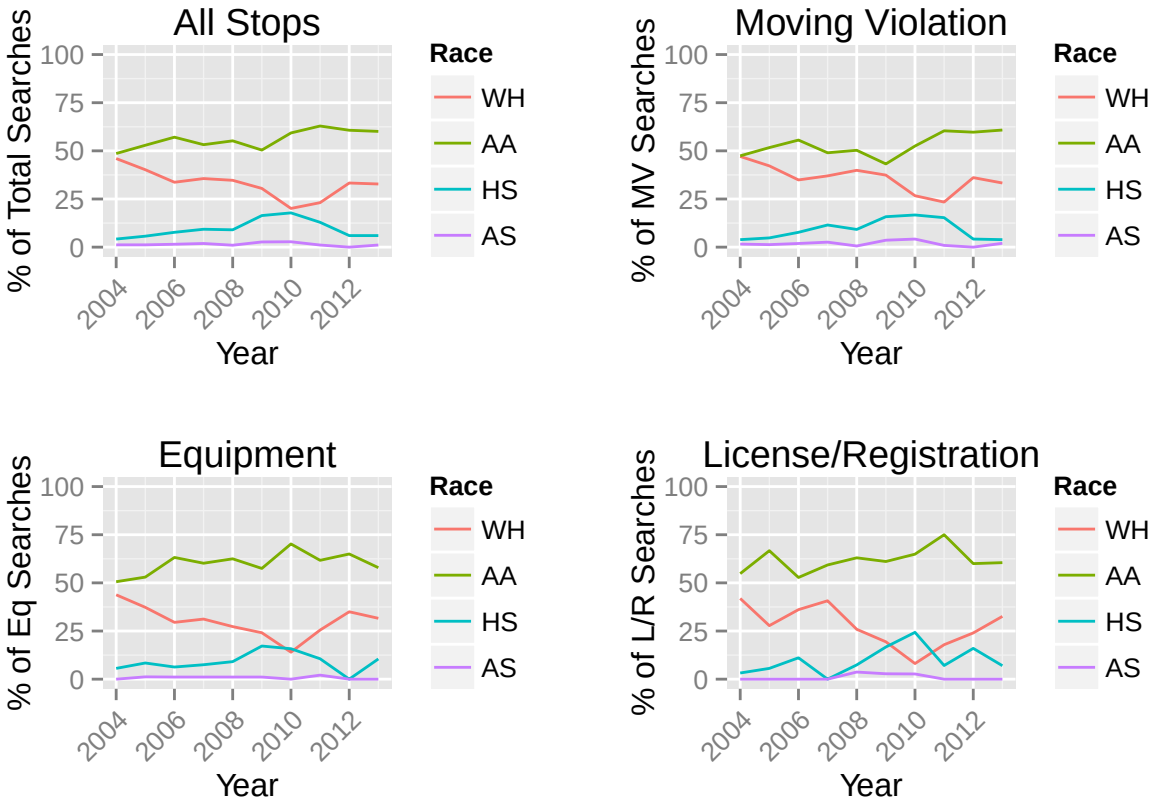


Figure 28: Proportion of Total Searches by Year, Race, and Type of Stop

The figure shows for each year what proportion of the years searches were conducted on drivers from each racial group

Comments

- African Americans consistently make up the majority of drivers searched.

Figure 29: Rates of Searches by Year, Race, and Type of Stop

The figure shows a given racial group, what proportion of their stops result in a search

Comments

- Hispanic and African American drivers are consistently more likely to be searched during a stop

Table 32: Total Searches by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	426	196	**46**	207	**48.6**	18	**4.2**	5	**1.2**
2005	331	133	**40.2**	175	**52.9**	19	**5.7**	4	**1.2**
2006	392	132	**33.7**	224	**57.1**	30	**7.7**	6	**1.5**
2007	312	111	**35.6**	166	**53.2**	29	**9.3**	6	**1.9**
2008	288	100	**34.7**	159	**55.2**	26	**9**	3	**1**
2009	262	80	**30.5**	132	**50.4**	43	**16.4**	7	**2.7**
2010	214	43	**20.1**	127	**59.3**	38	**17.8**	6	**2.8**
2011	186	43	**23.1**	117	**62.9**	24	**12.9**	2	**1.1**
2012	117	39	**33.3**	71	**60.7**	7	**6**	0	**0**
2013	183	60	**32.8**	110	**60.1**	11	**6**	2	**1.1**

Table 33: Searches for Moving Violations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	306	144	**47.1**	145	**47.4**	12	**3.9**	5	**1.6**
2005	230	97	**42.2**	119	**51.7**	11	**4.8**	3	**1.3**
2006	261	91	**34.9**	145	**55.6**	20	**7.7**	5	**1.9**
2007	192	71	**37**	94	**49**	22	**11.5**	5	**2.6**
2008	173	69	**39.9**	87	**50.3**	16	**9.2**	1	**0.6**
2009	139	52	**37.4**	60	**43.2**	22	**15.8**	5	**3.6**
2010	120	32	**26.7**	63	**52.5**	20	**16.7**	5	**4.2**
2011	111	26	**23.4**	67	**60.4**	17	**15.3**	1	**0.9**
2012	72	26	**36.1**	43	**59.7**	3	**4.2**	0	**0**
2013	102	34	**33.3**	62	**60.8**	4	**3.9**	2	**2**

Table 34: Searches for Lic/Reg by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	31	13	**41.9**	17	**54.8**	1	**3.2**	0	**0**
2005	18	5	**27.8**	12	**66.7**	1	**5.6**	0	**0**
2006	36	13	**36.1**	19	**52.8**	4	**11.1**	0	**0**
2007	27	11	**40.7**	16	**59.3**	0	**0**	0	**0**
2008	27	7	**25.9**	17	**63**	2	**7.4**	1	**3.7**
2009	36	7	**19.4**	22	**61.1**	6	**16.7**	1	**2.8**
2010	37	3	**8.1**	24	**64.9**	9	**24.3**	1	**2.7**
2011	28	5	**17.9**	21	**75**	2	**7.1**	0	**0**
2012	25	6	**24**	15	**60**	4	**16**	0	**0**
2013	43	14	**32.6**	26	**60.5**	3	**7**	0	**0**

Table 35: Searches for Equipment Violations by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004	89	39	**43.8**	45	**50.6**	5	**5.6**	0	**0**
2005	83	31	**37.3**	44	**53**	7	**8.4**	1	**1.2**
2006	95	28	**29.5**	60	**63.2**	6	**6.3**	1	**1.1**
2007	93	29	**31.2**	56	**60.2**	7	**7.5**	1	**1.1**
2008	88	24	**27.3**	55	**62.5**	8	**9.1**	1	**1.1**
2009	87	21	**24.1**	50	**57.5**	15	**17.2**	1	**1.1**
2010	57	8	**14**	40	**70.2**	9	**15.8**	0	**0**
2011	47	12	**25.5**	29	**61.7**	5	**10.6**	1	**2.1**
2012	20	7	**35**	13	**65**	0	**0**	0	**0**
2013	38	12	**31.6**	22	**57.9**	4	**10.5**	0	**0**

Table 36: Percent of Stops with Searches by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	1948	196	**10.1**	1227	207	**16.9**	112	18	**16.1**	261	5	**1.9**
2005	1707	133	**7.8**	1005	175	**17.4**	107	19	**17.8**	230	4	**1.7**
2006	2131	132	**6.2**	1401	224	**16**	138	30	**21.7**	344	6	**1.7**
2007	1854	111	**6**	1160	166	**14.3**	115	29	**25.2**	251	6	**2.4**
2008	2194	100	**4.6**	1332	159	**11.9**	171	26	**15.2**	327	3	**0.9**
2009	2240	80	**3.6**	1458	132	**9.1**	186	43	**23.1**	391	7	**1.8**
2010	1476	43	**2.9**	1169	127	**10.9**	139	38	**27.3**	293	6	**2**
2011	1463	43	**2.9**	992	117	**11.8**	130	24	**18.5**	244	2	**0.8**
2012	2169	39	**1.8**	1116	71	**6.4**	133	7	**5.3**	328	0	**0**
2013	2365	60	**2.5**	1273	110	**8.6**	157	11	**7**	492	2	**0.4**

Table 37: Percent of Stops with Searches for Moving Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	1415	144	**10.2**	828	145	**17.5**	83	12	**14.5**	188	5	**2.7**
2005	1406	97	**6.9**	706	119	**16.9**	73	11	**15.1**	189	3	**1.6**
2006	1704	91	**5.3**	953	145	**15.2**	107	20	**18.7**	285	5	**1.8**
2007	1373	71	**5.2**	691	94	**13.6**	77	22	**28.6**	197	5	**2.5**
2008	1668	69	**4.1**	770	87	**11.3**	108	16	**14.8**	249	1	**0.4**
2009	1600	52	**3.2**	771	60	**7.8**	111	22	**19.8**	276	5	**1.8**
2010	1035	32	**3.1**	654	63	**9.6**	92	20	**21.7**	231	5	**2.2**
2011	1103	26	**2.4**	609	67	**11**	90	17	**18.9**	183	1	**0.5**
2012	1694	26	**1.5**	713	43	**6**	95	3	**3.2**	252	0	**0**
2013	1715	34	**2**	753	62	**8.2**	92	4	**4.3**	346	2	**0.6**

Table 38: Percent of Stops with Searches for Lic/Reg Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	148	13	**8.8**	111	17	**15.3**	6	1	**16.7**	14	0	**0**
2005	71	5	**7**	66	12	**18.2**	8	1	**12.5**	3	0	**0**
2006	120	13	**10.8**	94	19	**20.2**	11	4	**36.4**	8	0	**0**
2007	118	11	**9.3**	96	16	**16.7**	6	0	**0**	7	0	**0**
2008	117	7	**6**	106	17	**16**	9	2	**22.2**	13	1	**7.7**
2009	167	7	**4.2**	177	22	**12.4**	21	6	**28.6**	24	1	**4.2**
2010	123	3	**2.4**	146	24	**16.4**	15	9	**60**	6	1	**16.7**
2011	125	5	**4**	126	21	**16.7**	15	2	**13.3**	7	0	**0**
2012	119	6	**5**	120	15	**12.5**	16	4	**25**	10	0	**0**
2013	204	14	**6.9**	180	26	**14.4**	26	3	**11.5**	32	0	**0**

Table 39: Percent of Stops with Searches for Equipment Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004	385	39	**10.1**	288	45	**15.6**	23	5	**21.7**	59	0	**0**
2005	230	31	**13.5**	233	44	**18.9**	26	7	**26.9**	38	1	**2.6**
2006	307	28	**9.1**	354	60	**16.9**	20	6	**30**	51	1	**2**
2007	363	29	**8**	373	56	**15**	32	7	**21.9**	47	1	**2.1**
2008	409	24	**5.9**	456	55	**12.1**	54	8	**14.8**	65	1	**1.5**
2009	473	21	**4.4**	510	50	**9.8**	54	15	**27.8**	91	1	**1.1**
2010	318	8	**2.5**	369	40	**10.8**	32	9	**28.1**	56	0	**0**
2011	235	12	**5.1**	257	29	**11.3**	25	5	**20**	54	1	**1.9**
2012	356	7	**2**	283	13	**4.6**	22	0	**0**	66	0	**0**
2013	446	12	**2.7**	340	22	**6.5**	39	4	**10.3**	114	0	**0**

Contraband

Number of Stops with Contraband Found

Figure 30: Amount of Contraband by Year, Race, and Type of Stop

The figure shows the total number of stops that resulted in contraband (drugs, paraphernalia,alcohol,weapons) being found.

** Comments**

- The data start in 2006.
- Finding contraband is a relatively rare experience
- Decline mirrors decline in total number of searches
- A back of the envelop calculation suggests a third of searches produce contraband (will follow up,more formally)

Percent of Total Contraband Found

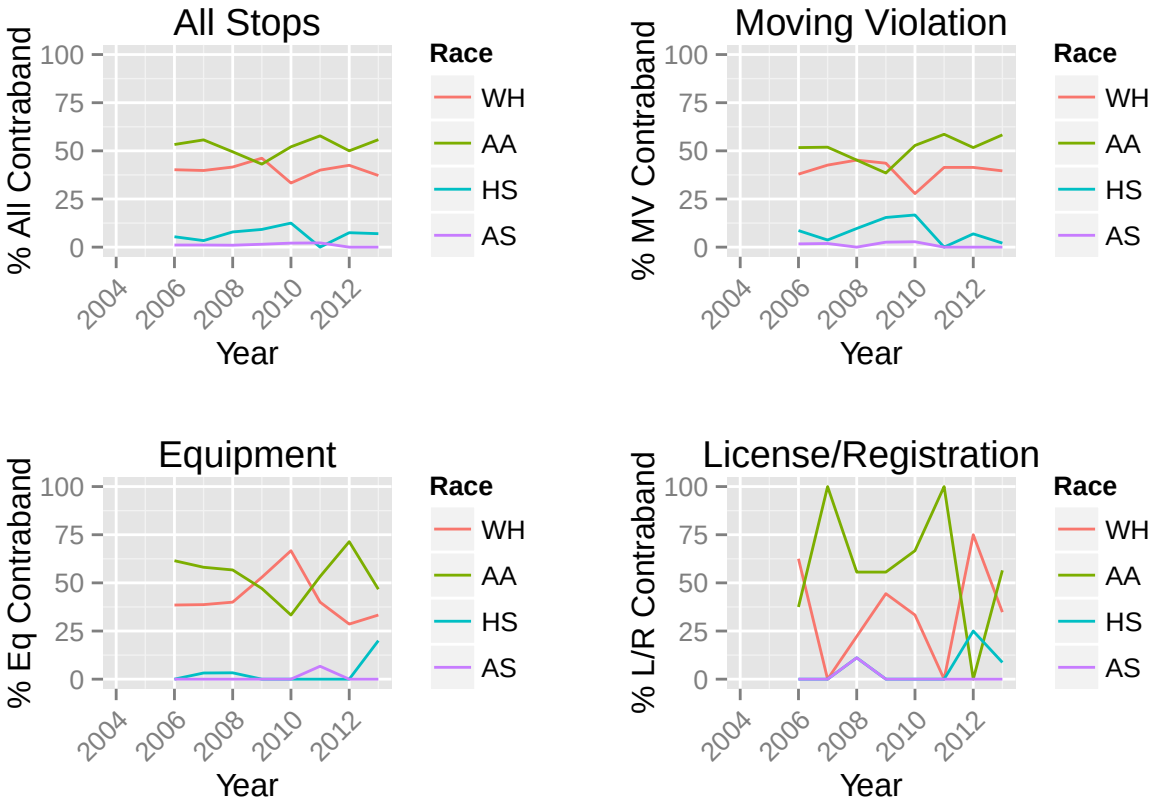


Figure 31: Porportion of Contraband by Year, Race, and Type of Stop

The figure shows the porportion of contraband found by driver's race.

** Comments**

- Majority of contraband found from stops involving African Americans and Whites

Percent of Stops with Contraband Found

Figure 32: Porportion of Stops with Contraband by Year, Race, and Type of Stop

The figure shows the proportion of the stops which result in contraband being found for each racial group.

Comments

- A relatively small proportion of stops result in contraband being found.

Table 40: Total Contraband Found by Race

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004									
2005									
2006	92	37	**40.2**	49	**53.3**	5	**5.4**	1	**1.1**
2007	88	35	**39.8**	49	**55.7**	3	**3.4**	1	**1.1**
2008	101	42	**41.6**	50	**49.5**	8	**7.9**	1	**1**
2009	65	30	**46.2**	28	**43.1**	6	**9.2**	1	**1.5**
2010	48	16	**33.3**	25	**52.1**	6	**12.5**	1	**2.1**
2011	45	18	**40**	26	**57.8**	0	**0**	1	**2.2**
2012	40	17	**42.5**	20	**50**	3	**7.5**	0	**0**
2013	86	32	**37.2**	48	**55.8**	6	**7**	0	**0**

Table 41: Contraband Found During Moving Violations

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004									
2005									
2006	58	22	**37.9**	30	**51.7**	5	**8.6**	1	**1.7**
2007	54	23	**42.6**	28	**51.9**	2	**3.7**	1	**1.9**
2008	62	28	**45.2**	28	**45.2**	6	**9.7**	0	**0**
2009	39	17	**43.6**	15	**38.5**	6	**15.4**	1	**2.6**
2010	36	10	**27.8**	19	**52.8**	6	**16.7**	1	**2.8**
2011	29	12	**41.4**	17	**58.6**	0	**0**	0	**0**
2012	29	12	**41.4**	15	**51.7**	2	**6.9**	0	**0**
2013	48	19	**39.6**	28	**58.3**	1	**2.1**	0	**0**

Table 42: Contraband Found During Lic/Reg Violations

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004									
2005									
2006	8	5	**62.5**	3	**37.5**	0	**0**	0	**0**
2007	3	0	**0**	3	**100**	0	**0**	0	**0**
2008	9	2	**22.2**	5	**55.6**	1	**11.1**	1	**11.1**
2009	9	4	**44.4**	5	**55.6**	0	**0**	0	**0**
2010	6	2	**33.3**	4	**66.7**	0	**0**	0	**0**
2011	1	0	**0**	1	**100**	0	**0**	0	**0**
2012	4	3	**75**	0	**0**	1	**25**	0	**0**
2013	23	8	**34.8**	13	**56.5**	2	**8.7**	0	**0**

Table 43: Summary of Contraband Found During Equipment Violations

		WH		AA		HS		AS	
	Total	#	%	#	%	#	%	#	%
2004									
2005									
2006	26	10	**38.5**	16	**61.5**	0	**0**	0	**0**
2007	31	12	**38.7**	18	**58.1**	1	**3.2**	0	**0**
2008	30	12	**40**	17	**56.7**	1	**3.3**	0	**0**
2009	17	9	**52.9**	8	**47.1**	0	**0**	0	**0**
2010	6	4	**66.7**	2	**33.3**	0	**0**	0	**0**
2011	15	6	**40**	8	**53.3**	0	**0**	1	**6.7**
2012	7	2	**28.6**	5	**71.4**	0	**0**	0	**0**
2013	15	5	**33.3**	7	**46.7**	3	**20**	0	**0**

Table 44: Percent of Stops with Contraband Found by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004												
2005												
2006	2131	37	**1.7**	1401	49	**3.5**	138	5	**3.6**	344	1	**0.3**
2007	1854	35	**1.9**	1160	49	**4.2**	115	3	**2.6**	251	1	**0.4**
2008	2194	42	**1.9**	1332	50	**3.8**	171	8	**4.7**	327	1	**0.3**
2009	2240	30	**1.3**	1458	28	**1.9**	186	6	**3.2**	391	1	**0.3**
2010	1476	16	**1.1**	1169	25	**2.1**	139	6	**4.3**	293	1	**0.3**
2011	1463	18	**1.2**	992	26	**2.6**	130	0	**0**	244	1	**0.4**
2012	2169	17	**0.8**	1116	20	**1.8**	133	3	**2.3**	328	0	**0**
2013	2365	32	**1.4**	1273	48	**3.8**	157	6	**3.8**	492	0	**0**

Table 45: Percent of Stops with Contraband Found During Moving Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004												
2005												
2006	1704	22	**1.3**	953	30	**3.1**	107	5	**4.7**	285	1	**0.4**
2007	1373	23	**1.7**	691	28	**4.1**	77	2	**2.6**	197	1	**0.5**
2008	1668	28	**1.7**	770	28	**3.6**	108	6	**5.6**	249	0	**0**
2009	1600	17	**1.1**	771	15	**1.9**	111	6	**5.4**	276	1	**0.4**
2010	1035	10	**1**	654	19	**2.9**	92	6	**6.5**	231	1	**0.4**
2011	1103	12	**1.1**	609	17	**2.8**	90	0	**0**	183	0	**0**
2012	1694	12	**0.7**	713	15	**2.1**	95	2	**2.1**	252	0	**0**
2013	1715	19	**1.1**	753	28	**3.7**	92	1	**1.1**	346	0	**0**

Table 46: Percent of Stops with Rates of Contraband Found During Lic/Reg Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004												
2005												
2006	120	5	**4.2**	94	3	**3.2**	11	0	**0**	8	0	**0**
2007	118	0	**0**	96	3	**3.1**	6	0	**0**	7	0	**0**
2008	117	2	**1.7**	106	5	**4.7**	9	1	**11.1**	13	1	**7.7**
2009	167	4	**2.4**	177	5	**2.8**	21	0	**0**	24	0	**0**
2010	123	2	**1.6**	146	4	**2.7**	15	0	**0**	6	0	**0**
2011	125	0	**0**	126	1	**0.8**	15	0	**0**	7	0	**0**
2012	119	3	**2.5**	120	0	**0**	16	1	**6.2**	10	0	**0**
2013	204	8	**3.9**	180	13	**7.2**	26	2	**7.7**	32	0	**0**

Table 47: Percent of Stops with Contraband Found During Equipment Violations by Race

	WH			AA			HS			AS		
	Stops	#	%	Stops	#	%	Stops	#	%	Stops	#	%
2004												
2005												
2006	307	10	**3.3**	354	16	**4.5**	20	0	**0**	51	0	**0**
2007	363	12	**3.3**	373	18	**4.8**	32	1	**3.1**	47	0	**0**
2008	409	12	**2.9**	456	17	**3.7**	54	1	**1.9**	65	0	**0**
2009	473	9	**1.9**	510	8	**1.6**	54	0	**0**	91	0	**0**
2010	318	4	**1.3**	369	2	**0.5**	32	0	**0**	56	0	**0**
2011	235	6	**2.6**	257	8	**3.1**	25	0	**0**	54	1	**1.9**
2012	356	2	**0.6**	283	5	**1.8**	22	0	**0**	66	0	**0**
2013	446	5	**1.1**	340	7	**2.1**	39	3	**7.7**	114	0	**0**

Duration of Stops

The figures below show the average duration of stops and different quantiles (e.g. at the 50th percentile, 50 percent of the drivers have a duration time lower and 50 percent have duration time higher than this value) stop duration for each racial group. The duration of stops tends to be signficantly higher for African Americans and Hispanics.

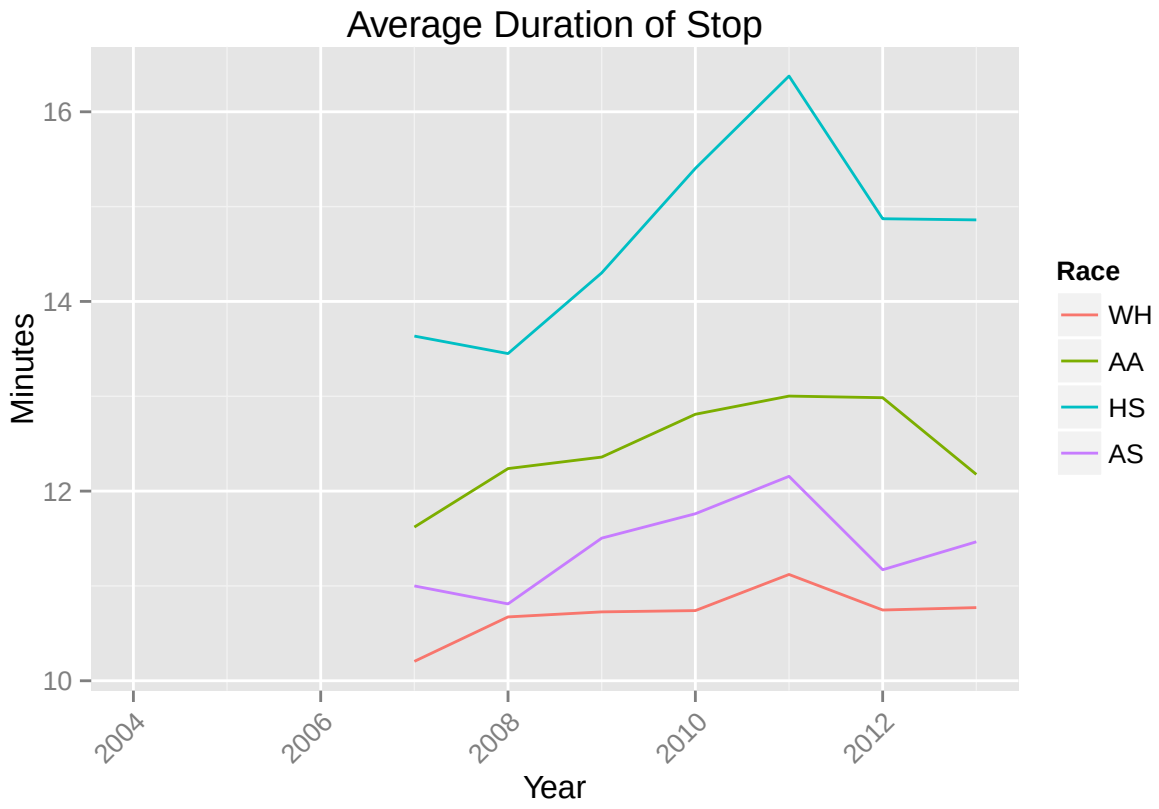


Figure 33: Average Duration of Stops

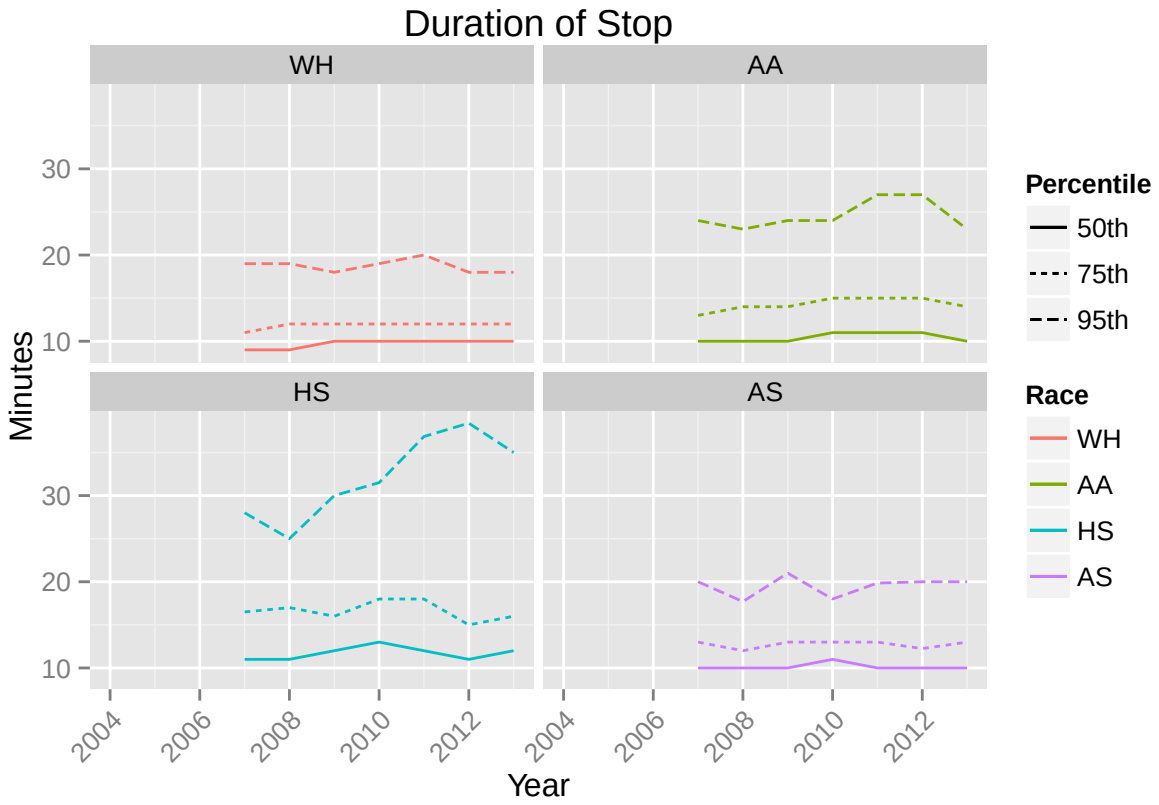


Figure 34: Percentiles of Duration of Stops