

Disparities in Policing — An Analysis on Ventura County in 2022

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Abstract

This paper analyzes racial disparities in policing using 2022 traffic stop data from Ventura County, CA. Differences in search rates across racial groups are documented, and the Veil of Darkness test is applied to examine whether officer visibility affects the racial composition of stops. Becker’s outcome test is used to compare search productivity across groups. The Veil of Darkness test finds no evidence that officer visibility influences who is stopped, while the outcome test finds searches of Black and Hispanic drivers are at least as productive as searches of White drivers.

1 Context and Summary Statistics

1.1 Data Overview

This analysis will use 2022 dataset of traffic stops from the California Racial and Identity Profiling Act (RIPA) for Ventura County, CA. Each observation represents a single police stop, and includes information on the individual such as the perceived race, reason of stop, whether a search occurred, and whether contraband was discovered. After cleaning and filtering, our sample consists of approximately 87,000 stops.

1.2 Stop Characteristics and Racial Composition

Table 1 reports the racial composition of police stops in Ventura County in 2022. Hispanic/Latino individuals account for the majority, at 51.4%, followed by White individuals at 38.9%. Black, Asian, and individuals classified as "Other" represent smaller shares of total stops.

The most stop reasons common include traffic violations, reasonable suspicion and wanted person.

Table 1: Stop Characteristics by Race, Ventura County (2022)

Race Group	Number of Stops	Percent of Stops
White	34054	38.9
Black	3994	4.6
Hispanic/Latino	45025	51.4
Asian	2112	2.4
Other	2464	2.8

Table 2: Top 5 Common Reasons for Traffic Stops

Reason for Stop	Number of Stops	Percent of Stops
Traffic Violation	56768	64.8%
Reasonable Suspicion	23435	26.7%
Knowledge of Outstanding Arrest/Wanted Person	3133	3.6%
Parole/Probation/PRCS/Mandatory Supervision	2217	2.5%
Consensual Encounter Resulting in Search	1697	1.9%

1.3 Search Rates by Race

Figure 1 shows search rates by racial group. We define a search as any search of a person, property, or vehicle including canine. Black and Hispanic/Latino individuals experience higher search rates than White individuals, while Asian individuals experience substantially lower search rates. These differences represent unconditional disparities and do not account for other contextual factors such as time of day, location, or officer discretion.

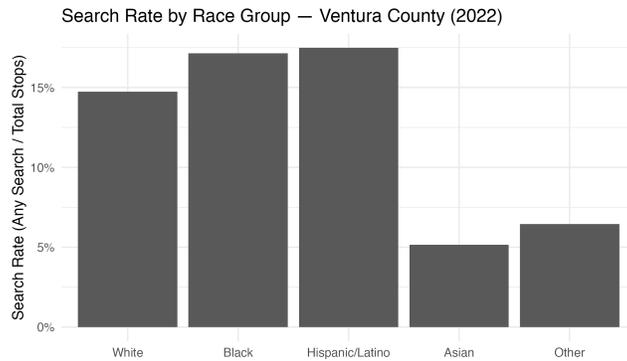


Figure 1: Search Rate by Race Group, Ventura County (2022)

1.4 Do Search Rate Disparities Imply Discrimination?

Differences in search rates among different racial groups do not by themselves imply discrimination. Decisions to search could be based on a lot of unobserved

factors, such as the time of the stop, driver behavior, and other context.

2 Veil of Darkness Test

2.1 Strategy

The Veil of Darkness Test exploits changes in officer visibility at sunset to study racial bias in traffic stops. The idea is that an officer’s ability to perceive a driver’s race is reduced after dark, while most other determinants of police stops change smoothly over time. By comparing stops just before and after sunset, we isolate variation in officer visibility that is plausibly unrelated to unrelated to underlying driving behavior.

We use historical sunlight data from the `suncalc` package in R, the sample is restricted to stops occurring within 60 minutes before and after sunset. The outcome variable is an indicator for whether the stopped individual is Black or Hispanic/Latino, and the explanatory variable is a daylight dummy indicating one if the stop occurred before sunset and zero otherwise. VOD relies on the assumption that, conditional on the time of day, the racial composition of drivers does not change discontinuously at sunset.

2.2 Results

Dependent Variable:	minority_bh
Model:	(1)
<i>Variables</i>	
Daylight (before sunset)	-0.0121 (0.0240)
<i>Fixed-effects</i>	
tod_bin_15	Yes
date_of_stop	Yes
<i>Fit statistics</i>	
Observations	7,153
R ²	0.07194
<i>IID standard-errors in parentheses</i>	
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>	

Table 3: Veil of Darkness Test — Ventura County (2022)

Table 3 shows the results of the Veil of Darkness test. The coefficient on the daylight indicator is negative but small in magnitude and statistically insignificant. The probability that a stopped individual is Black or Hispanic/Latino is approximately 1.2 percentage points lower during daylight relative to darkness; however, this difference is not statistically distinguishable from zero.

This result suggests that when focused in on the window around sunset and after controlling for time-of-day and date fixed effects, the racial composition of police stops in Ventura County does not change discontinuously at sunset. Under the assumptions of the VOD test, this finding provides no evidence that officer visibility systematically affects the likelihood of stopping Black or Hispanic/Latino drivers.

3 Becker’s Outcome Test: Hit Rates

3.1 Strategy

The Becker outcome test tests the potential for racial bias by seeing if a search was success, meaning contraband was found. The idea is that if police have a lower threshold of suspicion when deciding to search certain racial groups, searches of those groups should yield lower hit rates.

The sample is restricted to stops in which a search occurred. The outcome variable is an indicator equal to 1 if contraband was discovered during the search, and zero otherwise. The primary explanatory variable are indicators for the race of the individual, with White people as the reference group. If hit rates across different racial groups differ, this suggests that officers may be applying different thresholds of suspicion when deciding whom to search.

3.2 Results

Dependent Variable:	contraband_found	
Model:	(1)	(2)
<i>Variables</i>		
Constant	0.3190*** (0.0065)	0.3190*** (0.0065)
Black or Hispanic/Latino	0.0189** (0.0082)	
Black		0.0343* (0.0191)
Hispanic/Latino		0.0176** (0.0084)
<i>Fit statistics</i>		
Observations	13,849	13,849
R ²	0.00038	0.00044
<i>IID standard-errors in parentheses</i>		
<i>Signif. Codes: ***: 0.01, **: 0.05, *: 0.1</i>		

Table 4: Becker Outcome Test (Hit Rates) — Ventura County (2022)

Table 4 shows the results of 2 regressions for the Becker outcome test. Among searched White drivers, contraband is discovered approximately 31.9% of the time. When Black and Hispanic drivers are pooled together, the estimated coefficient indicates that searches of these groups yield about a 1.9% increase in hit rate over searches of White drivers, and is statistically significant at a 5% level.

When Black and Hispanic drivers are analyzed separately, hit rates are still both higher than for White drivers. The difference for Hispanic/Latino is about 1.7%, which is still significant. The increase in hit rate for Black people is still positive but less significant (10% level). Under the Becker Outcome test, these results do not provide evidence that officers apply a lower threshold of suspicion when deciding to search Black or Hispanic drivers. Conditionally on a search occurring, searches of minority drivers are at least as productive as searches of White drivers.

Although search rates differ substantially by race, hit rates do not follow the same pattern. Black and Hispanic drivers are searched more frequently but do not exhibit lower hit rates than White drivers. This suggests that higher search rates for minority drivers are likely not driven by lower thresholds under the Becker outcome test.