

APPENDIX C

Discriminatory Policing Data Analysis Methodology

Appendix A

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I. Databases

The disparate impact discriminatory policing analyses relied mostly on JPD's computer-aided dispatch, calls for service (all events for which police were dispatched to provide services), arrest, booking, ticketing, and use of force data. This data is stored across several SQL databases and systems, including PremierOne, DACRA, and IAPro.¹

A. PremierOne

JPD computer-aided dispatch, calls for service, arrest, and booking data comes from the PremierOne (P1) database system, which is managed by Will County. The P1 system contains hundreds of data tables related to calls for service, arrests, booking, field interviews, case reports, and officer reports. The data contained in this system is reliably consistent since January 1, 2017. Therefore, our analyses included records from January 1, 2017 through December 31, 2023, seven years of data.

B. DACRA

JPD ticketing data comes from their DACRA database system, which contains traffic, compliance, and parking citations stored across several data tables. JPD began using the DACRA system in 2018, so the data are only reliable for full years starting in 2019. Therefore, our analyses included ticketing records from January 1, 2019 through December 31, 2023, five years of data.

C. IAPro

JPD use-of-force data is housed in their IAPro database system. The IAPro system contains several data tables that store information about use-of-force events, including most information that is recorded on JPD's Defensive Action Reports, which is the main reporting method officers use to record information regarding use of force. The IAPro data are available for the entire length of the investigative period. Therefore, our analyses included use-of-force data from January 1, 2017 through December 31, 2023.

II. Analytic approaches

The disparate impact analysis was undertaken iteratively, beginning with an analysis that required few assumptions, but that may be confounded by competing explanations that are not

¹ JPD provided our data expert with login credentials to access the backend SQL data from a remote desktop connection.

included in the analysis. Subsequent analyses applied more advanced statistical techniques to adjust the data to allow for more balanced comparisons. For example, we first compared proportions of arrests by race to the proportion of community members by race. However, this comparison does not account for other factors that might drive proportional differences in race between arrests and community composition. Using more advanced statistical techniques to control for these alternative explanation factors requires more detail about each event (e.g., the data must include measures of the factors that affect each outcome present in the data). All statistical analyses were conducted using the R statistical software environment. Any analyses comparing raw proportions used chi-square tests of equal proportions and the propensity score matching analyses were conducted using the *twang* (Toolkit for Weighting and Analysis of Nonequivalent Groups) package.

A. Proportional enforcement

One approach to identifying racial disparities in policing is to compare the observed racial distribution of those stopped by police to the racial distribution of the community in which those people live. Essentially, the thinking behind this approach is that if policing behavior is not influenced by the race of the individual in question, then police officers should stop and/or arrest community members in a pattern that is proportional to the demographic makeup of the community in which they are policing. Although simple in its approach, this method has several shortcomings, including the possibilities that there are racial differences in offending, that there are racial differences in exposure to law enforcement, and that persons may be stopped in communities in which they do not actually live. Taken together, comparing the racial distribution of people stopped by police to the racial distribution of the population is open to many alternative explanations.

B. Matched Samples

A more comprehensive approach to evaluating potential racial disparities in policing is to compare policing behavior (e.g., stops, arrests, uses of force) based on race when as many other demographic and situational factors as possible are held constant between racial groups. These analyses allow differences in policing behavior based on race to be isolated from the effect of other alternative explanations for differences (e.g., offense type, sex, officer, time of day, location, etc.). These methods “match” comparison groups on as many relevant factors as possible to make sure that the groups are equivalent on all features except for race. Once control variables are used to match, any differences observed between the racial groups can be attributed to race instead of one of these alternative factors. The matching procedure creates weights that “upweight” persons in the comparison group with similar characteristics (e.g., sex, location, age) as persons in the target group (e.g., persons of color) and “downweight” persons with dissimilar characteristics in the comparison group compared to the target group. Essentially, for each group, each of the observations gets a weight that when averaged together equates the comparison group to the target group on these matching variables. After weighting, the starting point for the two groups (e.g., Black vs. white drivers stopped by JPD) is the same and any changes observed between the two groups can more easily be attributed to an effect of race. Of course, not all comparisons can be made with this approach as it requires a substantial number of variables to be measured for any groups that are compared. However, where possible, we conducted these analyses to better control for alternative explanations that may explain any racial differences in policing behavior.

For the post-traffic stop outcome comparisons, two sets of analyses were conducted, one for Black versus white drivers and one for Hispanic versus white drivers. The variables chosen for matching included location, time of day, month, year, reason for traffic stop, age of driver, and sex of driver. For comparisons involving stop length, additional matching variables were included to account for differences in stop length based on the nature of the stop. Specifically, whether or not a citation was issued, whether or not a search was conducted, and whether or not an arrest was made. Once the groups were balanced on these variables, the generated weights were used in a set of analyses that predicted post-stop outcomes from race.

For the use of force type comparisons, two sets of analyses were conducted, one for Black versus white recipients of force and one set for Hispanic versus white recipients of force. The variables chosen for matching included time of day, year, reason for use of force (e.g., “effect an arrest”), age of the individual, physical build of the individual (e.g., “small”), condition of the individual (e.g., “emotionally upset”), first recorded offense/charge, and officer race. Once the two racial groups were balanced on these variables, the generated weights were used in a set of analyses that predicted use of force outcomes from race.