Bias in Middlesex

I strongly believe that America's criminal justice institutes are racially-biased against people of color. But as a white, suburban resident of Masschusett's Middlesex County, this isn't something I have witnessed firsthand. In the interest of educating myself and other locals about institutional racism in my area, I ask the question: are Middlesex County's trial courts racially-biased?

I use a dataset from the Middlesex district attorney containing every criminal charge handled by the district from 2014 to 2021. I use three columns from this dataset:

- "Court Location" tells which court handled the charge. I use this to evaluate bias per-court.
- "Defendant Race" tells the defendant's race. The district attorney does not share how this information is collected, so its accuracy is dubious.
- "Disposition Description" tells how the charge was disposed of. For example, "nolle prosequi" means the district has chosen to drop the charge. I use this to evaluate how favorably defendants are treated.

I ignore charges missing any information because my analysis requires this information. "Disposition Description" is missing when a criminal case is still open or has been transferred out of the county. It is unclear why "Defendant Race" is sometimes missing. "Court Location" is always provided.

I combine all non-black and non-white defendants into an "Other" category because there are many races with little representation, which makes for imprecise observational statistics when examined in their small groups.

From "Disposition Description," I create a new column called "Disposition Favorability," which tells if a charge was disposed of in a manner that I would consider favorable for the defendant. In general, I mark any disposition in which the defendant was not convicted as favorable. For example, I consider "nolle prosequi" to be favorable.

To summarize favorability for a group of defendants, I use the mean-average (herein abbreviated “MDF”). This is the same as calculating the fraction of charges that were disposed favorably. The MDF can be between 0, meaning all charges were unfavorably disposed, and 1.

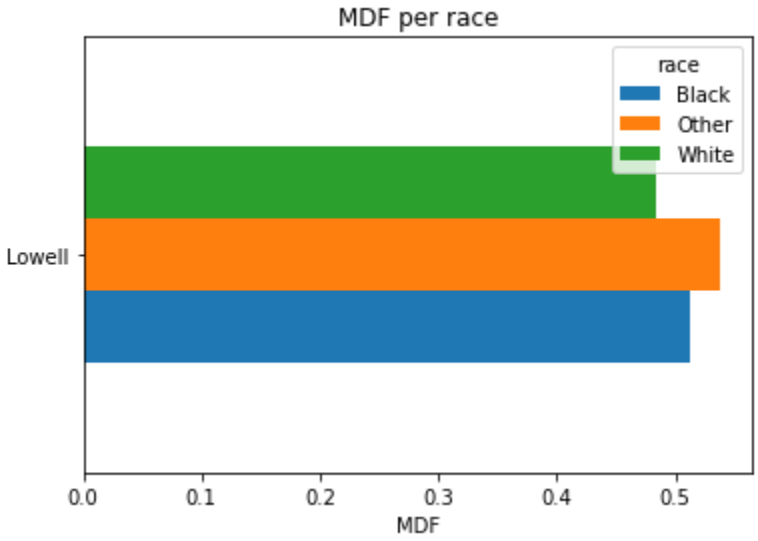


Figure 1

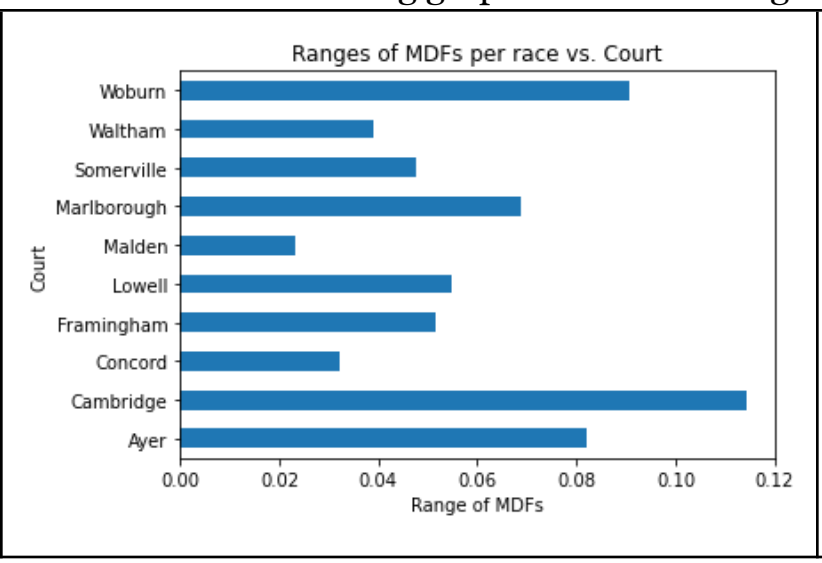
As per Fig. 1, approximately 50% of charges against black defendants in Lowell District Court were disposed of favorably.

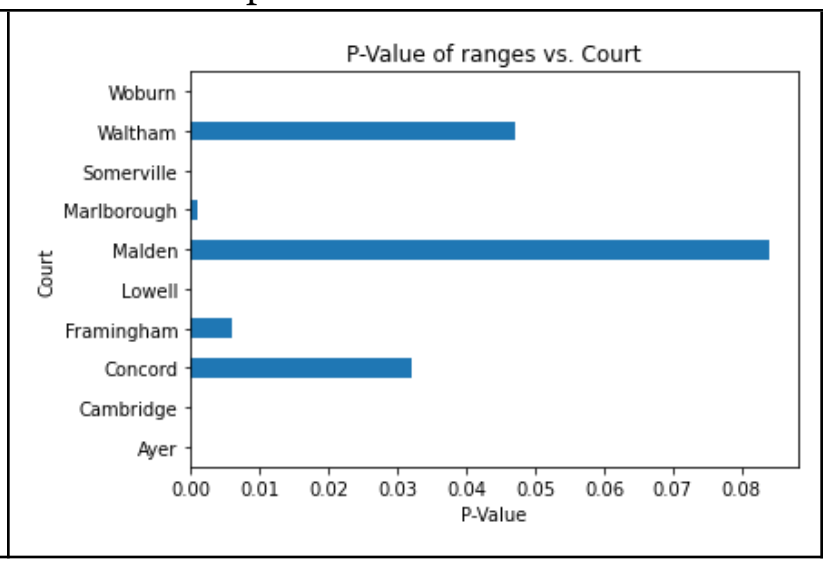
Ideally, each race’s MDF should be equal for a given court; this would mean that all defendants received equally favorable outcomes regardless of race. To quantify how far a court is from this ideal, I calculate the range between the minimum and maximum MDF per court (herein “Range of MDFs”). A range of 0 means the MDFs are all equal.

In Fig 1., Lowell’s Range of MDFs can be calculated by subtracting the “White” MDF (minimum) from the “Other” MDF (maximum).

Finally, I calculate a p-value for each court’s Range of MDFs using permutation tests. It is possible that the observed range between MDFs for each court exists under the null hypothesis, and the p-value allows us to see the likelihood of this.

The following graphs show the Ranges of MDFs and p-values.





All of the courts have a Range of MDFs below 0.16, and most have it below 0.08.

Cambridge has the greatest Range of MDFs at ~0.12 and a p-value of 0, meaning that there is very little chance that this range exists under the null hypothesis.

Malden has the lowest range at ~0.02, but the highest p-value at 0.08, meaning that there is a somewhat plausible chance that this range is due to random chance, which simply means we are further unsure as to what causes this range.

If we take the Range of MDFs to be equivalent to “amount of racial bias,” then Cambridge is the most concerning court (relative to the other courts) with a range of ~0.12 and a p-value of 0.

However, the p-value only indicates the chance that the corresponding range exists under the null hypothesis; it does *not* indicate confidence that

the range is due to racial bias. There is a multitude of real-world factors that could have combined to result in these observed ranges, and only one of them *might* be racial bias.

Furthermore, Range of MDFs cannot be equivalent to "amount of racial bias." The evaluation of each charge's disposition as favorable or not is completely based on my opinion, and thus MDF and Range of MDFs are inherently arbitrary metrics. Additionally, there are numerous different ways to evaluate the favorability of a charge's disposition and ways to aggregate that metric other than range – or, maybe it's better not to evaluate fairness based on charge dispositions at all.

Ultimately this dataset only provides one, limited perspective, and a better investigation into the fairness of the courts would likely involve in-person interviews and qualitative examinations of how defendants are treated at each step in the process once they are indicted or arraigned for a crime.

Here is a Jupyter Notebook for reproducing my results. I calculate the p-values using pseudorandomness, so you may get slightly different results.