Longitudinal Analysis of Disparities in Marijuana Arrests in the District of Columbia

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Background

- Studies consistently find that white people use marijuana at comparable rates to Black people.
  - Yet, Black Americans are arrested for marijuana possession at much higher rates than white Americans.
- In 2014, Washington, D.C. residents approved Initiative 71, thereby legalizing the use of marijuana.
  - However, racial disparity remains a big issue in D.C.'s marijuana arrests.

Problem Statements

- What is the extent of age and racial disparities in Washington, D.C.'s marijuana arrests?
- Is racial disparity in marijuana arrests linked to a systematic racial bias?

Initial Hypotheses

- Young adults (ages 18 – 35) are more likely to get arrested for marijuana offenses than older adults in Washington, D.C.
- There is ethno-racial disparity in D.C.'s marijuana arrests.
- After marijuana use was legalized in Washington, D.C., number of marijuana arrests reduced; however, ethno-racial disparity in marijuana arrests persists.
- There is an association between ethno-racial disparity in D.C.'s marijuana arrests and a systematic racial bias.

Methodology

- *Box plot* and *bar charts* to answer questions regarding disparity in marijuana arrests.
- Racial disparity linked to racial bias?
  - disparity in D.C.'s marijuana arrest rates is compared with disparity in D.C.'s arrests rates for serious crimes (homicide, robbery and burglary).

Data

- *DC Metropolitan Police Department*
    - Marijuana arrest data between 2012 and 2019 sourced in csv format.
    - D.C. crime incident data available in separate csv files for different years from 2013 to 2019.
- *US Census Bureau*
    - Excel file with ethno-racial composition of D.C.'s population by year.

MPD Arrests Datasets

- 21 variables in MPD Marijuana Arrests dataset with 12221 records.
- 26 variables in each of the 7 MPD Adult Arrests datasets with 210740 total records.
- Variables in MPD datasets include:
  - **Categorical variables**: *Marijuana_Arrest Type, Adult/Juvenile, CCN (Criminal Complaint Number), Arrest Year, Arrest Date, Arrest Number, Defendant Race, Defendant Ethnicity, Defendant Sex, Defendant District, Arrest Category*
  - **Quantitative variables**: *Arrest Time, Age, Arrest Latitude, Arrest Longitude, Offense Latitude, Offense Longitude*

US Census Bureau Dataset

	A	B	C	D	E	F	G	H	I	J	K	L	M
2	Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for District of Columbia: April 1, 2010 to July 1, 2019												
3	Sex, Race, and Hispanic Origin	April 1, 2010		Population Estimate (as of July 1)									
4		Census	Estimates Base	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
14	White	262,139	262,167	264,625	275,058	285,587	294,771	302,863	312,267	320,245	328,038	334,390	340,498
15	Black or African American	319,177	319,192	319,969	323,370	327,137	332,496	335,384	337,835	339,218	339,654	339,385	337,049
16	American Indian and Alaska Native	8,084	8,084	8,117	8,355	8,611	9,107	9,300	9,463	9,626	9,687	9,733	9,862
17	Asian	27,369	27,371	27,720	28,951	30,302	31,814	32,929	34,650	36,213	37,661	38,628	39,586
18	Native Hawaiian and Other Pacific Islander	1,514	1,514	1,554	1,621	1,681	1,746	1,799	1,854	1,860	1,866	1,867	1,871
19	**NOT HISPANIC**	**546,974**	**546,999**	**549,379**	**560,051**	**571,844**	**583,817**	**592,787**	**602,819**	**611,170**	**618,643**	**623,556**	**626,272**
20	One Race:												
21	White	210,389	210,397	211,946	218,971	226,093	231,955	237,317	243,699	249,422	255,398	260,081	264,400
22	Black or African American	302,051	302,066	302,598	304,905	307,938	312,337	314,555	316,378	317,187	316,992	316,103	313,290
23	American Indian and Alaska Native	1,342	1,342	1,345	1,326	1,401	1,447	1,396	1,382	1,414	1,398	1,418	1,413
24	Asian	21,151	21,152	21,333	22,126	23,064	24,144	25,136	26,576	27,818	29,009	29,808	30,541
25	Native Hawaiian and Other Pacific Islander	220	220	230	229	237	252	291	301	327	346	345	339

Figure 1: Snapshot of the excel file sourced from US Census Bureau with D.C.'s annual population estimates by race and ethnicity.
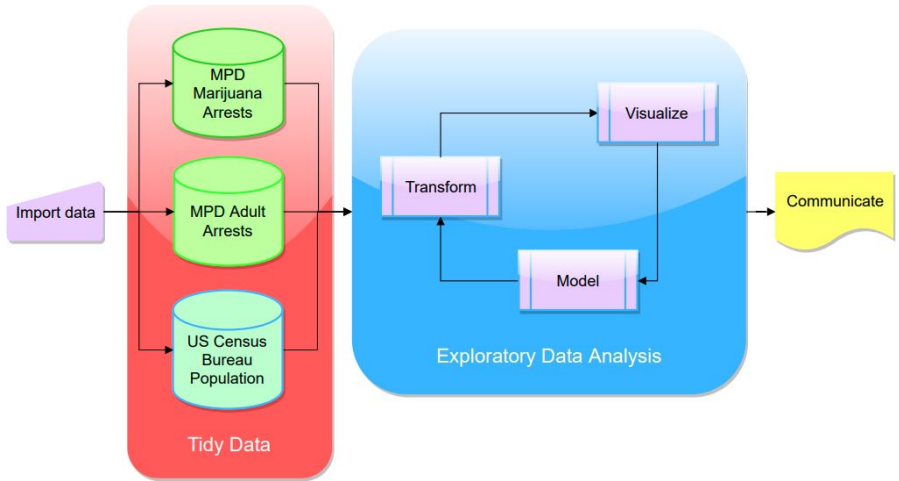
Description of the Steps

Figure 2: Graphical illustration of the steps involved.

EDA Example (not included in the report)

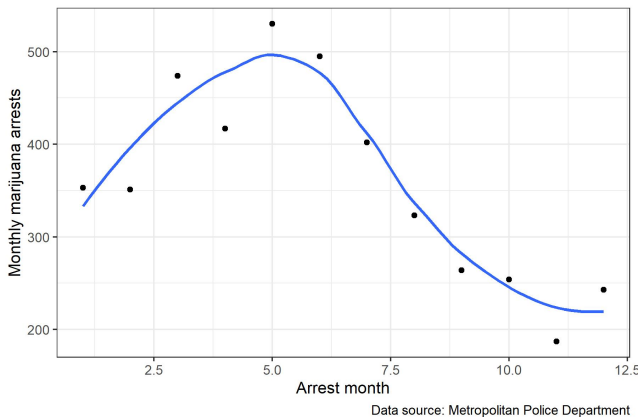Data source: Metropolitan Police Department

Figure 3: Seasonal disparity in D.C.'s marijuana arrests.

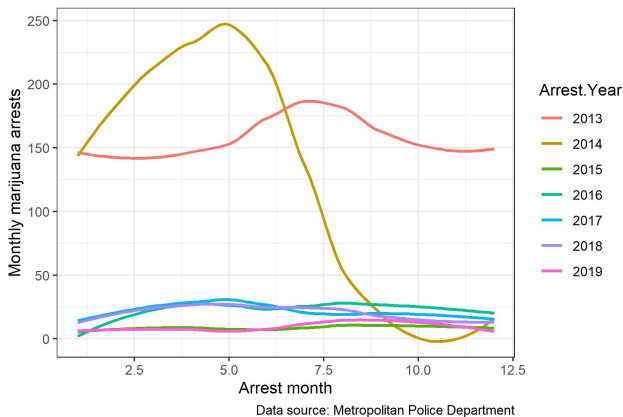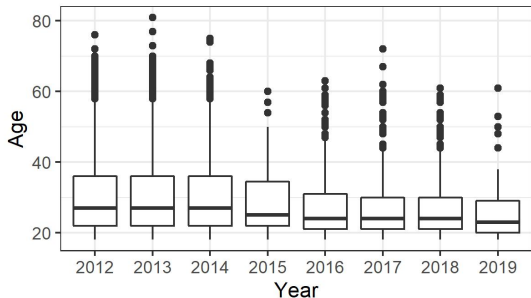# EDA Example (not included in the report)

Figure 4: Seasonal disparity in D.C.'s marijuana arrests.

Results

Data source: Metropolitan Police Department

Figure 5: D.C.'s marijuana arrestees' age distribution over the years. Average median age of D.C.'s marijuana arrestees is 27 years.
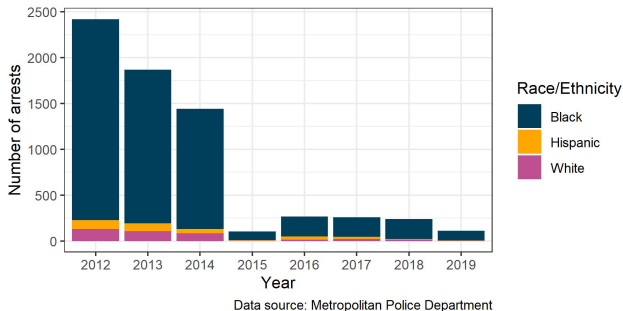
Results

Figure 6: Number of marijuana arrests for possession/consumption in D.C. for different ethno-racial groups over the years.
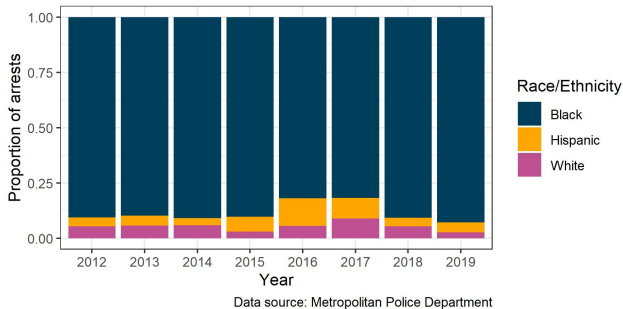
Results

Figure 7: Relative ethno-racial composition of marijuana arrests for possession/consumption in D.C. over the years.

Results

Data source: Metropolitan Police Department and US Census Bureau
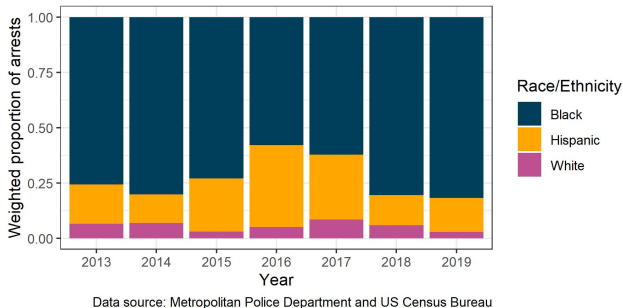
Figure 8: Relative ethno-racial composition of marijuana arrests for possession/consumption in D.C. weighted by respective ethno-racial populations over the years, where Weight $= 1e+05$/ethno-racial population.
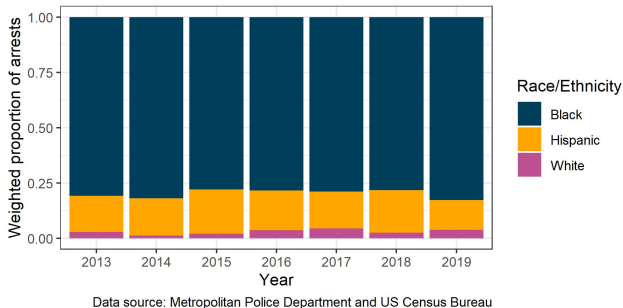
Results

Figure 9: Relative ethno-racial composition of arrests for homicide, robbery and burglary in D.C. weighted by respective ethno-racial populations over the years, where Weight = 1e+05/ethno-racial population.

Useful?

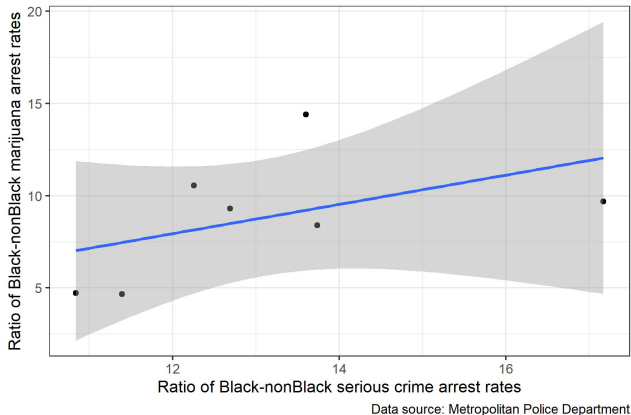Data source: Metropolitan Police Department

Figure 10: Relative Black-nonBlack arrest rates in D.C. for serious crime vs. Relative Black-nonBlack arrest rates in D.C. for marijuana possession/public consumption.

Conclusion and Future Direction

- Evidence in support of Initial *Hypotheses 1, 2* and *3*.
  - Though marijuana legalization may help to reduce existing disparities in marijuana-related arrests for Black Americans in the long run, in the near term, the study suggests no decrease in existing disparities.
- Inconclusive evidence for Initial *Hypothesis 4*.
  - Should be tested using some other approach that can provide a more conclusive answer.
  - Other predictor variables such as family background, education and fatal drug overdose may be used.

Discussion

- Correlation coefficient only measures the strength of the relationship between the *relative movements* of two variables.
  - Racial bias is based on perception, which is relatively static.
- When Hispanics and whites are treated as separate ethno-racial groups, the gulf between Black and white Americans regarding marijuana arrest rates is much more pronounced than usually reported.

Questions?

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