Brief Report: Intersectionality of Police Homicides

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ABSTRACT

The US has a had a long and problematic history of police practices, especially in minority communities. Over the last 60 years since the Civil Rights Act, racial income disparities and racial inequalities overall have only slightly diminished. Each year hundreds of individuals across the US are killed by police, and these deaths tend to come from America's poorest neighborhoods, the same neighborhoods that also tend to have the highest number of non-white residents. Because of this, it is crucial to look at neighborhood context when analyzing data concerning police homicides. This report explores how understanding community demographics can help target racial inequality and prevent police-related deaths. To accomplish this the study analyzed, the relationship between individuals' race/ethnicity and their community's tract* median household income in the context of community demographic.

Keywords: Police Homicide, Income Inequality, Race

INTRODUCTION

In 2015 The Guardian released The Counted, a collection of stories and articles intended to shed light on police violence in the US. The series has articles from dozens of journalists and a database of personal details from more than 400 individuals killed by the police that year. Police homicide data is especially difficult to uncover as many departments across the US refuse to release the information. In order to reliably collect this data, reporters from The Guardian coordinated with several online communities and interviewed hundreds of families. Using the collected data from The Guardian, a final data set was created that included county and census tract demographics, taken from the 2015 US Census, for each incident. The main question explored in this report is whether the racial bias in police homicides is at least partially linked to the community-level economic status of said racial/ethnic groups.

METHOD

The data set contains information collected from 463 individuals murdered by police across the US in 2015. Because of the small number of instances of Asian/Pacific Islanders (n = 12) and Native Americans (n = 5) analysis was only performed on data collected from White, Hispanic/Latino, and Black individuals. Additionally, the study was unable to use gender as a confounder because of the small number of women incidents (n= 21). After removing outliers (n = 70) using Cook's distance, the data set contained 205 White, 61 Hispanic/Latino, and 110 Black individuals. The outcome variable for this study, community-level economic status, was measured using tract median household income, inputted as a continuous variable. Correlation analysis, using Spearman method and ANOVA, was then used to identify potential confounders, those being county median household income, percentage of county population older than 25 with BA or higher, as well as tract population. Descriptive statistics for the sample data are shown in Table 1.

Table 1

	White (N=205)	Hispanic/Latino (N=61)	Black (N=110)	Overall (N=376)
Tract Household Income				
Mean (SD)	46000 (14000)	39800 (11700)	36800 (13900)	42300 (14300)
Median [Min, Max]	44200 [17900, 84700]	37300 [17400, 67500]	34500 [11400, 67100]	41000 [11400, 84700]
County Income				
Mean (SD)	49200 (10400)	51400 (9790)	51800 (12300)	50400 (10900)
Median [Min, Max]	48800 [25500, 84900]	53100 [24900, 77500]	49300 [22500, 91700]	49500 [22500, 91700]
College Rate				
Mean (SD)	19.7 (11.2)	15.6 (11.7)	17.8 (13.1)	18.5 (11.9)
Median [Min, Max]	16.6 [2.64, 63.6]	12.6 [1.35, 56.0]	13.4 [1.41, 66.2]	15.9 [1.35, 66.2]
Tract Population				
Mean (SD)	4990 (2000)	4860 (2130)	4070 (1850)	4700 (2020)
Median [Min, Max]	4700 [1350, 13600]	4420 [1360, 14000]	3770 [678, 10200]	4430 [678, 14000]

**A census tract is a relatively small statistical subdivision of a county.*

ANALYSIS

To explore the question if "racial/ethnic groups killed by police differ in community-level economic status," the null hypothesis will be that when accounting for county/tract demographics the outcome remains constant across all stated groups. To test this hypothesis, analysis was performed using linear regression with tract household income as the outcome variable, race/ethnicity as the predictor and county income, college rates, and tract population as the confounding variables. Since tracts are within a county, county median household income was included in the model to account for differences in living costs across the US. County level college rates were also included as various studies have shown increases in rates of higher education are strongly associated with increases in personal/household income. Lastly, tract population was also included as housing density has been shown to be directly linked to cost of living and employment rates within cities in the US.

Other confounders such as poverty rate and unemployment rate were considered for addition to the model, however, these variables did not have a linear relationship with household income and therefore could not be added. To decide upon the final model ANOVA's were used to determine which variables should be included. Assumptions for linear regression were then tested after the model was fit, and were all subsequently passed. All analyses were run in R and the significance level was set at $\alpha = .05$ a priori.

Table 2

	Dependent variable:
	Tract Household Income
Intercept	$7{,}970^{***}$
	(3,349, 12,591)
Hispanic/Latino	$-4{,}172^{***}$
	($-6{,}791$, $-1{,}554$)
Black	$-7{,}100^{***}$
	($-9{,}265$, $-4{,}934$)
County Income	0.327^{***}
	(0.239, 0.416)
College Rate	613.2^{***}
	(532.8, 693.6)
Tract Population	1.976^{***}
	(1.504, 2.447)
Observations	376
R^2	0.604
Adjusted R^2	0.598
Residual Std. Error	9,037 (df = 370)
F Statistic	112.7^{***} (df = 5; 370)
Note:	*p<0.1; **p<0.05; ***p<0.01

RESULTS

Table 2 outlines the results and variables used in the linear regression model, along with observations of the model itself. The model had a fairly decent Adjusted R^2 value of .598 and a statistically significant F statistic which highlights that the model does have at least have one significant predictor. The addition of other variables such rurality and county health might have increased model fit and the Adjusted R^2 value, however, no such data was collected in the original data set. Overall, the results of the model show that, when holding the confounding variables constant, on average Hispanic/Latino and Black individuals killed by the police come from tracts where household income is far lower when compared to white individuals. Concerning confounders, the model shows each to have a statistically significant positive relationship with the outcome variable.

Regarding the interpretation of race/ethnicity as the main predictor variable, on average the model predicts that Hispanic/Latino individuals were killed in areas where the household income is \$4,172 lower than whites and Black individuals in areas where the household income is \$7,100 lower than whites when holding all other variables constant. Since the p-values calculated were p = 0.001037 and p = 3.15e-10 for Hispanic/Latinos and Blacks respectively, we can say these differences are statistically different than 0. These findings suggest that community-level economic status is significantly associated with the race/ethnicity of the individual killed by the police.

As for the other test variables, median county income shows a significant moderately positive linear relationship with a calculated p-value and correlation statistic of p = 1.34e-12 and r = 0.41. On average, the model suggests each dollar increase in county income is associated with a \$.327 increase in tract household income. Unsurprisingly, county-level college rates also show a significant positive relationship with p = 2e-16 and r = 0.63, where on average, for each percentage increase in college rates, we expect tract household income to increase by \$613.20. Lastly, on average, for each person increase in tract population, we will expect tract household income to increase by \$1.976, this finding was also statistically significant with p = 4.96e-15 and r = 0.41.

DISCUSSION

Returning to the research question, the results of this report support the notion that racial/ethnic groups killed by police in the US differ significantly in community-level economic status. This connection suggests that the racial bias in police homicides towards minorities can at least be partially explained by community-level influences. Previous national-level studies have concluded that lethal force is often used by US police at higher rates on people of color and lower income individuals, however, few studies have analyzed how community forces have a role in police related deaths. When discussing any topic like that of police violence in the US, it is especially important to understand the itersectionality of the issue, that is how various other systematic issue can lead to the unfortunate outcome we observe. This report provides evidence for what measures should be better understood to get a larger view of explicit racial bias seen in police homicides.

Police-related violence is a growing topic within public health, and as the field aims to prevent and respond to deaths and injuries experts must have information available to better understand where the issue stems from and how to address it. The results of this report suggest that community-level economic status, measured by median tract household income, is one source that contributes to the bias we see. Through previous research it has been shown how the most disadvantaged members of society, often lower income minorities, tend to face the greatest pressure and incentives to commit crime when living in areas of high inequality. From this we can determine that the appropriate response from that organizations focused on decreasing the risk of police violence and departments interested in health equity includes monitoring and lessening the impact that income disparities have amongst Black and Hispanic/Latino communities.

Figure 1

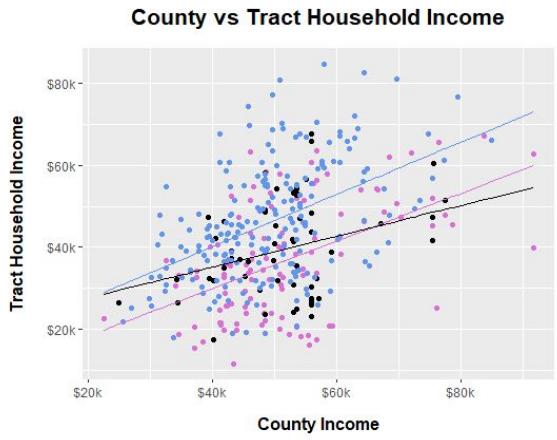
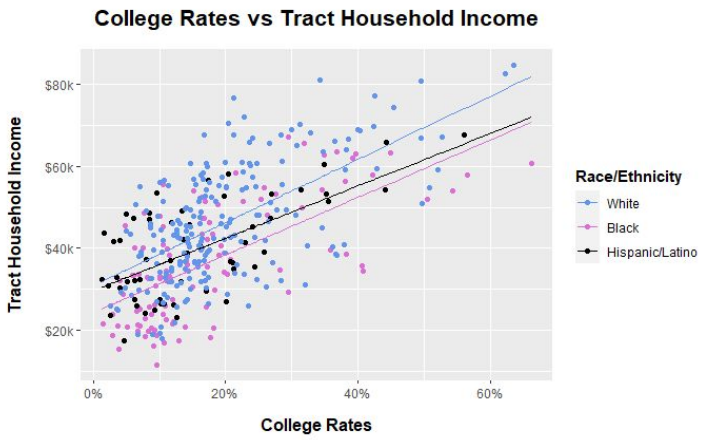


Figure 2



**Regression lines displayed are for visualization purposes only and are not from the linear model used in the report.*

Within the linear model we also included various confounders such as county median household income, county college rates and tract population, all of which were found to also be statistically significant predictors of tract household income. With context that tract household income (community-level economic status) is a partial explanation for police racial bias, both county income and college rates posed interesting explanations for possible causes of income disparities among minority communities. As shown in Figure 1, both Black and Hispanic/Latino individuals murdered by police lived in tracts that receive proportionally less income than whites living in a county with similar median household incomes. Likewise, in Figure 2, we can see a similar effect as Blacks and Hispanic/Latino individuals lived in tracts that also received relatively less than their white counterparts. For this report these variables solely served as confounders, but in future reports it might be worthwhile exploring how systemic issues such as problematic hiring practices and lack of diversity within higher education could lead to the same racial income disparities that explain racial bias within police homicides.

CONCLUSION

In assessing the racial discrimination of minorities in police violence, it was found that the race/ethnicity of an individual killed by the police was a statistically significant predictor of their community's median tract household income, which indicates that the racial bias in police homicides can be partially attributed to community-level factors. This report controlled for county median household income, county college rate, and tract population and found when controlling for these variables Hispanic/Latino individuals lived in tracts where the household income was $4,172 lower than whites and Black individuals in areas where the household income is $7,100 lower than whites. This report also discussed possible actions and future research that could be done going into the future.

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