An Empirical Analysis of the Socioeconomic Status of Blacks on Police Treatment and Arrests

A Granger Causality Approach

By

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Abstract

The purpose of this paper is to investigate the fundamental causes that help us understand why the Black community is the racial and ethnic group that is the least well-treated among all minority groups by the police. Many studies have argued that the racial bias of the police towards Blacks is the reason why Blacks are condescendingly treated by the police, which implies that the police in America are racist. This paper argues, however, that the condescending treatment that Blacks receive from the police is not fundamentally based on race but rather on their socioeconomic status. The empirical results of our analysis suggest that the relationship between the socioeconomic status of Blacks and police arrests of Blacks is statistically significant. We, therefore, concluded that the socioeconomic status of Blacks Granger-caused their number of police arrests. Therefore, the primary motivation of the police to treat Blacks and arrest them is based on the assumption of their low-income status rather than the mere fact that they are Black.

1. Introduction

Relations between the police and the Black community have always been tumultuous. Most members of the Black community argue that the condescending treatment they receive from the police is profoundly racially motivated. Many studies have shown that ethnic and racial groups do not receive the same treatment by the police. These studies argue that is the consequential factor that explains why Blacks are treated far more condescendingly by the police. For example, according to a study conducted by the Pew Research Center, Black Americans are far less likely than Whites to give police high marks for the way they do their jobs.[1] In a 2016 survey, only about a third of Black adults said that police in their community did an 'excellent' or "good" job in using the right amount of force (33 percent compared with 75 percent of Whites), treating racial and ethnic groups equally (35% vs 75%), and holding officers accountable for misconduct (31% vs 70%).[2]

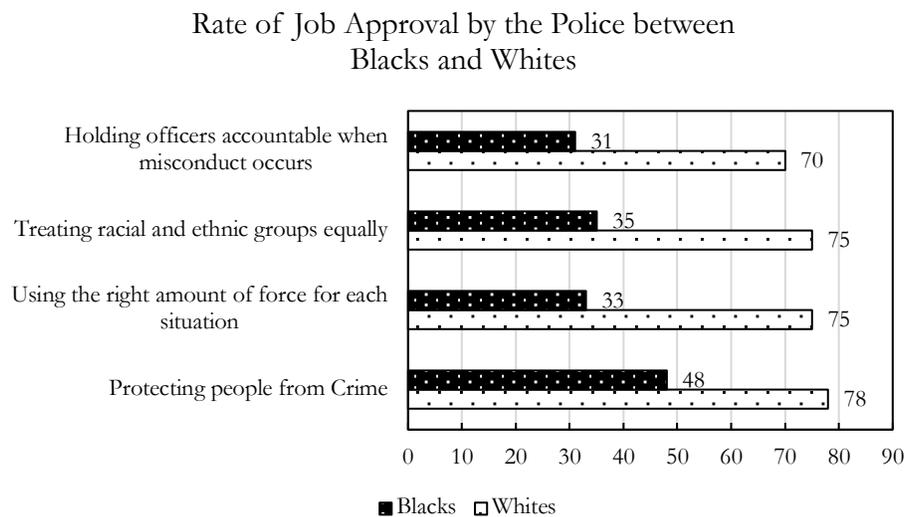Rate of Job Approval by the Police between Blacks and Whites

Figure 1. Source: Pew Research Center

Another study conducted by Mark Hoekstra, an economist at Texas A&M University in College States, concluded that White officers dispatched to Black neighborhoods fired their guns five times as often as Black officers dispatched for similar calls to the same neighborhoods.[3] In the statistical models of these studies, the racial prejudice variable has been the most significant predictor in their research.

We believe that the distrustful relationship that exists between the Black community and the police is much deeper than racial bias. As a matter of fact, to understand the foundation of this turbulent relationship, it is important to assess the historical and socioeconomic correlation between the racial identity of a community and its income. In the United States, this historical and socioeconomic correlation is based on the assumption that Blacks in particular, and minority groups in general, are assumed to be poor, uneducated, and criminals whereas Whites are assumed to be educated, and

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[1] Desilver, Drew; Lipka, Michael; Fahmy, Dalia. "10 Things we know about race and policing in the U.S." *Pew Research Center.* (2020).

[2] Ibid.

[3] Peeples, Lynne. "What the data say about police brutality and racial bias—and which reforms might work." *Nature.* (2020).

wealthy. Based on this assumption that has become part of the American social order, the police have consequently proceeded in inflicting harsher treatment on minority groups, especially Blacks.

Our paper, however, argues that the condescending treatment that the police inflict on the Black community is not fundamentally based on racial prejudice but rather on the socioeconomic status of its members. We hypothesize that the Black Americans do not all receive the same condescending treatment by the police but rather that only Blacks with lower socioeconomic status receive much harsher treatment from the police than middle-class and upper-class Blacks. To empirically test our initial assumption that police arrests of Blacks are rather based on their socioeconomic status than their race, we applied the Granger-causality method.

2. Theoretical Framework

The theoretical framework we are proposing in this paper is short and very straightforward. Our theory assumes that the need for police is based on the socioeconomic status of the community that demands it. Low-income neighborhoods need more policing than high-income neighborhoods. In low-income communities, unemployment and poverty create a state of lawlessness where violence and crime are the two main factors that dictate the behavior of the people living in these neighborhoods.

As a result, people living in these neighborhoods are far more recalcitrant to respect the authority of the police than people living in affluent neighborhoods. In the eyes of the police, low-income people are less inclined to be law-abiding citizens than high-income people. The higher is the socioeconomic status of a neighborhood, the less policing is required and the more respectful the police would be to treat the people of that neighborhood. Conversely, the lower is the socioeconomic status of a neighborhood, the more policing is required, and the more condescending the police would be towards the people of those neighborhoods. This could be assessed in the following models we developed. This consequently would lead to differential treatment by the police towards members of the same community who yet have different socioeconomic statuses.
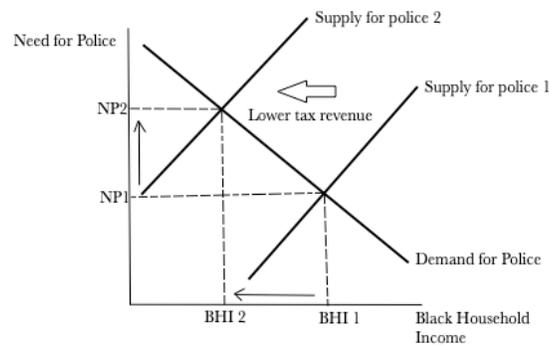
Need for police in low-income Black neighborhoods

Figure 2

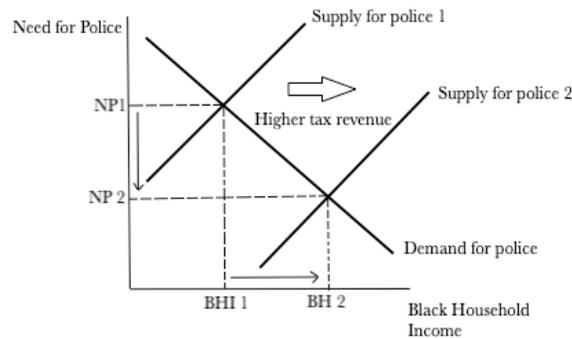# Need for police in affluent Black neighborhoods

Figure 3

3. Empirical Analysis: The Granger Causality Approach

In this part of our analysis, our purpose is to statistically test the relationship between the socioeconomic status of Blacks, and the number of Black people arrested by the police and establish that socioeconomic status granger-causes the number of Black people arrested by the police. We assume that the bad treatment that the police inflict on Blacks could be reflected in their number of arrests.

The data we use to conduct our statistical analysis were provided by U.S. Census Bureau for Black household income and the U.S. Department of Justice for the number of Black people arrested by the police. The data capture 30 years of evolution between these two variables, going from 1990 to 2020. Let now us write the variables that will be tested in mathematical form:
Y_t = Number of Black people arrested by the police over time
X_t = Black household income, which represents the socioeconomic status of Blacks over time

We subsequently hypothesize that variable X that evolves over time Granger-causes another evolving variable Y if predictions of the value of Y based on its own past values and on the values of X are better than predictions of Y based only on Ys own past values.

Statement of statistical hypothesis:
H_0 = There is no difference in variance between X and Y, therefore X does not Granger-cause Y
H_A = X has a higher variance than Y, therefore, X Granger-causes Y

a) Best AR Model of Y_t

Let us commence by stating the general statistical model of the autoregressive model (AR):

$$Y_t = \beta_{10} + \beta_{11}Y_{1t-1} + \beta_{12}Y_{2t-2} + \cdots + \beta_n Y_{mt-n} + \varepsilon_{yt}$$

To determine which lags are the most statistically significant, we ran the regression on five lags. The results of our regression show the following:

Regression output of Variable Y (Number of Black people Arrested)

Variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.21288025	0.25004412	0.85137075	0.40464236	-0.3087026	0.73446314
Y (t-1)	1.00674345	0.23510416	4.28211662	0.00036375****	0.51632475	1.49716214
Y (t-2)	0.20839489	0.35579227	0.58572068	0.56461492	-0.5337748	0.95056456
Y (t-3)	-0.060986	0.35500974	-0.1717868	0.86533146	-0.8015233	0.67955136
Y (t-4)	-0.2557138	0.35356324	-0.7232476	0.47790181	-0.9932338	0.48180623
Y (t-5)	0.03549291	0.25306179	0.14025392	0.88986227	-0.4923847	0.56337054

Table 1

The results of our regression show that only (Y_{t-1}) is statistically very significant with a p-value that is less than 5%. In our case (p<0.001), which shows that there is strong evidence against the null hypothesis at one lag prior. Hence the best AR model of Y is:

$$Y_t = \beta_{10} + \beta_{11}Y_{1t-1} + \varepsilon_{yt}$$

b) Adding the Terms of X_t

Now that we have determined the best AR model for Y_t, let us determine the best AR model for X_t using the same process.

$$X_t = \beta_{20} + \beta_{21}X_{1t-1} + \beta_{22}X_{2t-2} + \cdots + \beta_n X_{mt-n} + \varepsilon_{xt}$$

We are also using five lags to determine which one is the most statistically significant. The results of our regression could be interpreted as the following:

Regression Output of Variable X (Black household income)

Variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	11.4811309	5.27152571	2.17795217	0.04155047*	0.48492092	22.4773408
X(t-1)	1.07370305	0.22352577	4.80348653	0.00010813****	0.60743645	1.53996964
X(t-2)	-0.4841726	0.34065346	-1.4213055	0.17063386	-1.1947633	0.22641803
X(t-3)	0.59598499	0.36631917	1.62695553	0.11939956	-0.1681434	1.36011338
X(t-4)	-0.435673	0.37220162	-1.1705296	0.25554689	-1.212072	0.34072595
X(t-5)	-0.0295668	0.24153104	-0.1224141	0.90379281	-0.5333917	0.47425813

Table 2

Like in the previous regression, the results of this regression that only X(t-1) is statistically significant with a p-value of less than 5 %. In our case (p<0.001), which shows that there is strong evidence against the null hypothesis at one lag prior. Hence the best AR model of X is:

$$X_t = \beta_{20} + \beta_{21}X_{1t-1} + \varepsilon_{xt}$$

c) *Mathematical Statement of Granger Causality*

Now that we have determined the statistical significance of each variable, let us now assess the Granger causality of our model by applying the F-Test. Before applying the F-Test, it is important to state the Granger-causality mathematically based on the following model:

$$GC_t = \beta_{30} + \beta_{31}Y_{1t-1} + \beta_{32}X_{1t-1} + \varepsilon_{GCt}$$

Let us now apply the F-test. The formula of the F-test is:

$$F \; value = \frac{\sigma_1^2}{\sigma_2^2} = \frac{larger \; sample \; variance}{Smaller \; Sample \; variance}$$

F-Test Two Samples for Variance

	X(t-1)	Y (t-1)
Mean	40.6340385	3.67657692
Variance	5.70412404	0.30906801
Observations	26	26
df	25	25
F	18.455886	
P(F<=f) one-tail	1.1669E-10	
F Critical one-tail	1.95544721	

Table 3

In applying the F-test, the results show that the F-value is much higher than F Critical one-tail value. It suggests the variance of the Black household income is higher than the number of Blacks arrested by the police. Therefore, we reject the null hypothesis and conclude that Black household income Granger-causes the number of Blacks arrested by the police. In other words, the predictions of the value of Y based on its own past values and on the past values of X are better than predictions of Y based only on its own past values. The past values of the Black household income variable help us predict better the past values of Black arrests.

   The following graph in figure 4 shows the Granger causality relationship between Black household income and the number of Blacks arrested by the police based on the initial five lags. As the household income of Blacks increased overall, the number of Black people being arrested substantially decreased. This could be explained by the fact that more Blacks began to move to the middle-class bracket of the income distribution. Being middle-class suggests that those in that income bracket are employed, pay higher taxes, and live in neighborhoods where safety is already established and therefore the need for constant policing is less.

   An example to reinforce the validation of our hypothesis is the study conducted by Ronald Weitzer in the *Law and Society Review* (2000). The results of his empirical research suggest that Blacks living in affluent neighborhoods and Blacks living in low-income neighborhoods do not receive the same

treatment.[4] The study focused on Washington, D.C. where three neighborhoods were examined: a middle-class White neighborhood, a middle-class Black neighborhood, and a lower-class Black neighborhood. These neighborhoods are Cloverdale (middle-class White neighborhood), Merrifield (middle-class Black neighborhood), and Spartanburg (lower-class Black neighborhood).[5] Merrifield residents asserted that they received similar treatment as White neighborhoods, while Spartanburg residents overwhelmingly characterized their neighborhood as receiving inferior treatment. Merrifield's socioeconomic status manifests itself in well-maintained houses and yards and an absence of signs of neighborhood disorder: there are no abandoned houses, no open-air drug markets, and few young people loitering in public places and causing trouble.[6] Logically, crime is much lower in such a neighborhood like Merrifield, therefore, the need for constant policing is not a necessity. In Spartanburg, however, crime rate is much higher, groups of idle young people frequent the streets, crack houses exist, streetcorner drug selling is prevalent, and other street deviants (prostitutes, homeless) can be found.[7] Hence, based on how the lifestyle of Spartanburg is managed, police intervention would be more than ever needed to monitor safety than in a neighborhood like Merrifield. We can see indeed that although racial biases exist within the police, the differential treatment between communities is not fundamentally based on race but the socioeconomic status of communities. In short, the higher is the socioeconomic status of a neighborhood, the less policing is required and the lower is the socioeconomic status of a neighborhood, the more policing is required. The police act less condescendingly in affluent neighborhoods than in low-income neighborhoods.

Granger Causality of Black Household Income on
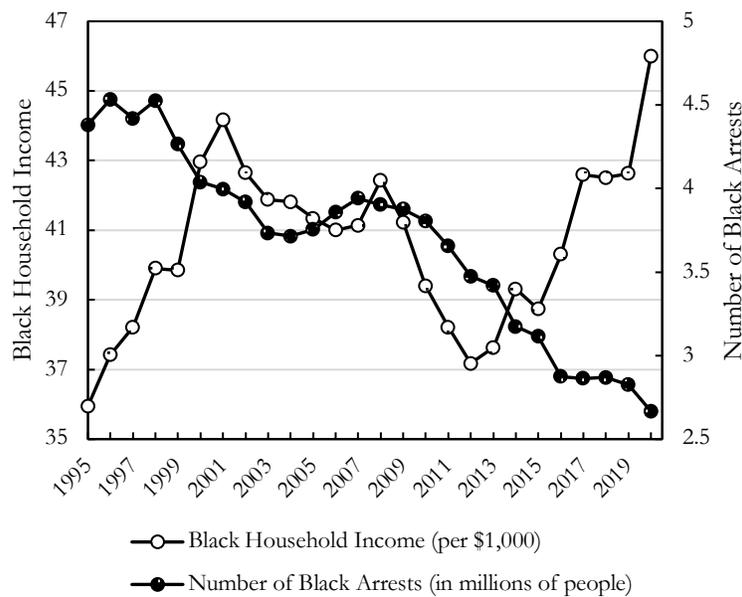Number of Black Arrests Based on the 5 lags

Figure 4

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[4] Weitzer, Ronald. "Racialized Policing: Residents' Perceptions in Three Neighborhoods." *Law & Society Review.* Vol. 34, No. 1 (2000), pp. 129-155

[5] Ibid. p. 134

[6] Ibid. p. 151

[7] Ibid. p. 151

4. Conclusion

It is evident that the police do not treat all people the same. The differential treatment that the police give to each community is based on their socioeconomic status rather than their race. Indeed, the statistical results of our analysis suggest that the household income of Black Americans Granger-causes the evolution of the number of Black arrests. It supports our hypothesis that the socioeconomic status of Blacks plays a fundamental role in the relations between the police and the Black community. It is the fundamental element that leads to the differential of treatment by the police.

Black Americans are not equally condescendingly treated by the police. The evidence pointed out that Blacks living in affluent neighborhoods had a treatment similar to Whites living in the same neighborhoods while Blacks living in lower-class neighborhoods are treated much harsher. In 2020, George Floyd, a Black American citizen, was brutally murdered by White police officer, Derek Chauvin. Derek Chauvin placed his knee on Floyd's neck for nearly nine minutes before the latter deceased sometime after. Would Derek Chauvin have dared to place his knee on the neck of Calvin Broadus (Snoop Dogg) or LeBron James if they were in George Floyd's place? Surely not. And the reason is that Calvin Broadus and LeBron James are both wealthy individuals despite being Black. One undeniable fact is that George Floyd was of low-income status. If George Floyd had a higher socioeconomic status or was wealthier like Broadus or James, Chauvin would have probably not done what he did. His action that led to Floyd's death was the epitome of the condescending treatment that Blacks receive because they are poor, not because they are Black.

In the United States, the concept of race is based on the social-class apparatus. Asian Americans are a racial and ethnic minority group like Blacks or Hispanics, and yet the police do not treat them with the most utter disrespect. This is because the Asian community is not only the richest minority group but also the wealthiest community of the national population, according to the U.S. Census Bureau data. Most Asians are considered law-abiding citizens and live in affluent neighborhoods where the need for constant policing is very low. Since poverty is the precursor to crime, thus, the poor are seen as potential criminals. In American society, the community that unfortunately most reflects poverty is the Black community since it has the lowest income per capita of all racial and ethnic communities in the United States, and this income per capita is below the median income per capita.

The objective of our study was, in no way, to condone why the police behave the way they do toward Blacks of lower economic status, but to simply demonstrate what was the real factor that triggers them to inflict such treatment on low-income Blacks. In short, so long as most members of the Black community remain in poverty, the police will regrettably continue to treat them condescendingly and more unfairly than other communities.

References

1. Desilver, Drew; Lipka, Michael; Fahmy, Dalia. "10 Things we know about race and policing in the U.S." *Pew Research Center.* (2020).

2. Ibid.

3. Peeples, Lynne. "What the data say about police brutality and racial bias—and which reforms might work." *Nature.* (2020).

4. Weitzer, Ronald. "Racialized Policing: Residents' Perceptions in Three Neighborhoods." *Law & Society Review.* Vol. 34, No. 1 (2000), pp. 129-155

5. Ibid. p. 134

6. Ibid. p. 151

7. Ibid. p. 151