

Analysis of Police Use of Force in the New York Stop and Frisk Policy

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Abstract

This study analyzes the Stop and Frisk policy in New York City to see if there is any evidence of racial profiling in force used by police officers. The study uses a logit model to estimate the probability of having force used on an individual conditional on being stopped. The probability of having force used on blacks and Hispanics is higher. A model specification with an interaction term between race of the suspect and crime rate of the precinct where the individual stopped further suggests that the difference in probability of force between blacks, Hispanics and whites is highest in low crime rate precincts. For precincts with higher crime rates the difference in probability between blacks, Hispanic and whites is lower.

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1. Introduction

One of the most controversial issues facing the United States law enforcement community is the police use of force against racial minorities. High profile incidents of police violence against racial minorities such as the Rodney King, Abner Louima, and Amadao Diallo cases have led to increased tension between law enforcement and minorities. The most recent case was that of Michael Brown, an 18 year-old African American male, who was shot by Darren Wilson, a 28 year old white police officer on August 9, 2014. The shooting, the subsequent protests and later the grand jury decision not to indict Officer Wilson for any criminal charges have led to a nationwide uproar and raised important questions about police brutality and racial discrimination. The death of Eric Garner in Staten Island after a NYPD police officer put him on a chokehold have similarly raised questions about racial bias in police behaviour. Similar to these high profile incidents of police violence, controversial policies such as the Stop and Frisk policy in New York City have worsened the relationship between law enforcement and racial minorities. The purpose of this study is to analyze the police use of force during a Stop and Frisk encounter in New York City and to evaluate if there is any evidence of racial profiling.

The paper is important for several reasons. First, it aims to answer whether or not the probability of force used on individuals during a Stop and Frisk encounter in New York City varies by race. The Stop and Frisk policy has been highly criticized by civil rights advocates for violating constitutional rights. Recent events such as the Ferguson protests have placed a greater strain on police-community and it is important that issues such as racial profiling, excessive force on minorities and harassment are addressed vigorously.

Second, research on police use of force has traditionally focused on sociological, psychological and organizational theoretical frameworks. However, largely absent from the

research is the role of neighbourhood context to explain police use of force. This study, therefore, contributes to the literature on Stop and Frisk policy in New York by exploring the neighbourhood context of police behaviour. The neighbourhood context is described in the “Literature Review” section of the paper.

Third, the study can have some meaningful implications for the controversies surrounding the Stop and Frisk policy in New York City. From 2006 to 2013 approximately 4 million individuals in New York City were stopped by the police, out of which 53% were blacks and 32% were Hispanics. Any evidence of racial bias in the police use of force raises important questions about the Stop and Frisk policy in New York, which affected approximately 3.4 million blacks and Hispanics in 8 years.

This study uses a logit model to estimate the likelihood that force is used on an individual controlling for encounter level, suspect level and precinct level characteristics. The study finds that the probability of having force used on blacks and Hispanics is higher than whites. The difference in probability of force between blacks, Hispanics and whites is highest in low crime rate precincts. This difference in probability of force between blacks, Hispanic and whites is smaller in high crime rate precincts.

This study makes a number of contributions to the literature. First, all other studies on the Stop and Frisk policy in New York have worked with only one period at a time. This study covers a period of eight years from 2006 to 2013, thereby working with a larger data set. Second, analysis of the stop and frisk policy has almost exclusively focused on stop rates of individuals and comparison of “hit rates”, i.e. efficiencies in the proportion of stops that yield positive results. This study contributes to the literature by focusing solely on the police use of force during a Stop and Frisk encounter.

The paper is structured as follows. The next section provides some background details about the Stop and Frisk policy. Section 3 is an extensive review of existing literature. Section 4, 5 and 6 presents the theoretical framework, data and the empirical model respectively. The paper discusses the results and findings in section 7 and concludes in section 8.

2. Background

The Stop and Frisk policy in New York Police Department that began in the early 1990's was largely influenced by the "broken windows" theory of policing. Keilling and Wilson (1982) said that "If a window in a building is broken and is left unrepaired, all the rest of the windows will soon be broken". Disorder like a broken window can lead to increased fear and withdrawal from residents and hence, generate and sustain more serious crime. The broken windows model of policing suggests that police should focus on disorder and less serious crime so that residents can take control and prevent serious crime from infiltrating their neighbourhood. William J. Bratton, the NYPD police commissioner appointed in 1994 and later reappointed in 2014, is a proponent of the broken windows theory and was largely responsible for the widespread use of the Stop and Frisk policy in New York. Proponents of the Stop and Frisk policy strongly advocate that the rigorous policing policy was responsible for the substantial reduction of crime rate in the city during early 1990's. Opponents of the policy believes that it violates two constitutional protections. They claim that the Fourteenth amendment is violated since suspects are arrested without any legal basis. They also make claims of racial profiling and discrimination, which once again violated the Fourteenth Amendment.

3. Literature Review

Werthman and Piliavin's (1967) ecological contamination hypothesis states that police attach the socioeconomic characteristics of the neighbourhood to an individual suspect independent of his/her demographics. They hypothesized that the police officers' perceptions are affected by the environment and concluded that suspects in dangerous neighbourhood are perceived as more dangerous. Geographic areas that are perceived as dangerous by the police have higher crime rates, lower incomes and higher minority populations. Police do not apply excessive force to blacks simply because they are black, but because they encounter more blacks in dangerous neighbourhoods where the police feel more threatened.

Bailey and Mendelsohn (1969) similarly used the neighbourhood context to conclude that low income and high crime rate neighbourhoods are subjected to more aggressive and punitive police behaviour. Smith's (1986) study included data from the Police Survey Study where he used a sample of 762 encounters with non-dangerous suspects in 60 neighbourhoods in Rochester, St. Louis, Tampa and St. Petersburg.ⁱ His results are similar to Werthman and Piliavin's ecological contamination hypothesis. He further claims that police officers are more likely to use force on Black suspects. This effect, however, was smaller when the neighbourhood context was taken into account.

The Office of Attorney General (OAG) in New York analyzed the highly controversial Stop and Frisk policy of the New York Police Department in response to allegations of systematic police misconduct. The research paper analyzed more than 181,000 field interrogation cards completed by NYPD officers from 1998 to 1999. The OAG regression analysis shows that blacks and Hispanics were significantly more likely than whites to be "stopped" after controlling for race specific precinct crime rates (as measured by arrests) and precinct population

composition by race.ⁱⁱ This study analyzes the same data set as the OAG report except that it works with more recent data (2006 to 2013). A comparative analysis of the more recent data with the 1999 data set would have allowed us to analyze whether or not the appointment of a New York Police commissioner in 2000 affected the way police behaved with minorities. Such an analysis, however, will be not possible because the 1999 data is not available publicly for legal reasons. Unlike the OAG research paper, my paper focuses on racial profiling in the use of force instead of the “stops” encounters. Despite the difference, this paper was very useful since it worked with precinct level data.

The then New York Police Commissioner Howar Saffi stated that “the racial distribution of the subject of the Stop and Frisk reflects the demographics of known violent crime suspects as reported by crime victims” (Saffi, 1999).ⁱⁱⁱ A more recent study addresses such claims by performing a multi level analysis of New York’s 75 precincts (Gelman et al., 2006). By taking into account the precinct level characteristics, the study is consistent with theories of policing such as “broken windows” that strongly emphasizes local and neighborhood strategies. Gelman et al. (2006) finds that blacks and Hispanics are stopped more often than whites, both in comparison to the population of these groups and to the best estimates of the rates of crimes committed by each group.^{iv} After controlling for precinct level characteristics, the pattern still holds.

4. Theoretical Model

The purpose of this study is to analyze the police use of force during a stop and frisk encounter. In the theoretical model the economic agents are the police officers who stop and frisk individuals in New York City. The choice variable is whether or not to apply force on the individual. Subject to constraints, the police will try to maximize welfare by minimizing crime.

The police face a budget constraint where departmental budget is the difference between government funds and expenses. Other than resource and time constraints, there are political constraints in this model. The police cannot stop everyone in the street because people in NY are not necessarily tolerant towards the Stop and Frisk policy.

The study aims to analyze if the use of police force varies by race of the individuals stopped after controlling for other variables. It hypothesizes that there is evidence of racial profiling in the use of force in the New York Stop and Frisk policy.

5. Data

The primary data source for this research will be the Stop and Frisk data from New York Police Department website. This dataset is compiled and recorded from the UF 250 form, an administrative form filed by police officers after a stop and frisk is initiated. The UF 250 form records several aspects of the stop including suspect demographics, time and location of the stop, suspect crime, rationale for the stop, etc. Other characteristics of the stop such as whether the suspect was frisked, arrested, issued summon, etc. are also recorded in the form. The New York Police Department compiles and annually releases information from the UF 250 forms in a standardized manner.

The study works with the stop and frisk data from the time period 2006-2013 (8 years). The original data set is publicly available in the New York Police Department (NYPD) website. For the purpose of this study, a cleaned data was collected from Sharad Goel, an Assistant professor at Stanford University who has worked on Racial Disparities in New York City's Stop-and-Frisk Policy. The data set includes approximately 4 million observations. For practical and technical purposes, the study works with a 25% random sample of each of the year.

The crime rate data by each precinct is also obtained from the New York Police Department website. The NYPD records reported crime and offense data based upon the New York State Penal Law and other New York State Laws. The tabular data summarizes the law categories by law class, Felony, Misdemeanor and Violation. There is a further subdivision into broad crime and offense categories, e.g. Felonious Assault, Grand Larceny, Misdemeanor Criminal Mischief, etc. There are separate tables for Seven Major Felonies, Non-Seven Major Felony Crimes, Misdemeanors and Violations. The crime rate data is for the period 2000 to 2013.

The precinct level characteristics such as unemployment rate, percentage of black in the population were obtained from the American Community Survey (ACS) 2008 -2012 (5 year estimates). The New York Census tract and block level data was converted to precinct level with the use of specific GIS (Graphical Information System) software. The New York City precinct level data set was compiled with the assistance and expertise of the Odum Institute and Research Hub at the University of North Carolina at Chapel Hill

Figure 1 shows the total number of individuals stopped during a stop and frisk encounter from the period to 2006 to 2013. The bar charts show that number of pedestrians stops gradually increased from 2007 to 2011, fell slightly in 2012 and by 2013 dropped to one third of its previous year's stops. One of the major reasons behind this drop is the mounting and public scrutiny of the NYPD practices, including a federal judge's 2013 ruling that they were unconstitutional.

Table 1 shows the probability of force being applied on an individual broken down by race for each borough of the five boroughs and for the whole city of New York. The probability of force is 23.8%, 22.2% and 16.4% for Hispanics, blacks and whites respectively. Therefore, the probability of force for Hispanics and blacks is 7.2% and 5.8% higher than whites. In each of the

five boroughs in New York City the probability of force is higher for blacks and Hispanics than whites. However, the probability of force being applied on each race varies according to the location where the individual was stopped. For instance, the differential probability of force between whites and blacks (6.3%) and whites and Hispanics (8.1%) is highest in Queens. It is lowest in Staten Island where the differential probability between white and blacks and white and Hispanics is 5.8% and 2.9% respectively. It is possible that the police officers' perception are affected by the socioeconomic characteristics of the borough and as a result, the probability of force varies by the borough where the individual is located.

Table 2 shows the summary statistics for each variable in the base specification model. On the average 21.6% of the individuals stopped in the sample data set had some kind of force used on them. From henceforth in the paper, this average would be referred to as mean force. Among the individuals who had force used on them, 53.3% were black, 31.6% Hispanic, 9.8% white and 5.2% other race. Casing a victim or location is the most commonly cited reason to stop an individual (30% share of the reasons of stop). The table further shows that the average crime rate and percentage of black population is 2.58 and 34.579 respectively.

Figure 2 shows the racial composition of individual stopped by police. According to the Figure, percentage of black stopped by the police was highest over the 8 years, followed by Hispanics, whites and other race. During the period from 2006 to 2013 the percentage share of black, Hispanic, white and other race is approximately 53%, 32%, 10% and 7%.

Figure 3 shows the incidence of force applied by police from 2006 to 2013. According to Figure mean force reaches its peak in 2009. The mean force decreases from 2009 to 2012. However, the mean force increases from 2012 to 2013 which is unexpected because the total number of individuals stopped decreased by two third from 2012 to 2013.

Figure 4 shows the incidence of force applied by police on each race from 2006 to 2013. Similar to figure 3, each of the graphs in figure 4 reaches its peak in 2009, then decreases from 2009 to 2012 and then increases from 2012 to 2013. The mean force on Hispanics is the highest throughout the 8 years, followed by blacks, other race and white.

Table 3 shows the summary statistics of key variables by crime rate level in the sample. The mean force in precincts with very low crime rates is 21.0% and it increases to 25.6% in high crime rate precincts. The increase in mean force from low to high crime rate intuitively makes sense since it is possible that police are more aggressive and willing to apply force in high crime rate precincts where they might feel more threatened. The average age and height of the individuals stopped and share of female stopped do not vary much across very low, low, high and very high crime rates. However, the share of individuals stopped by race vary significantly across precincts with different crime rates. The share of blacks stopped in precincts with very low and low crime rates are 26.8% and 54.9% respectively. The percentage of black population in precincts with very low and low crime rates are 11.9% and 34.4% respectively. The share of blacks stopped in these precincts is much greater than the percentage of black population. This suggests that police are stopping more blacks without taking into account the representative black population in that area.

Finally, Table 4 shows the summary statistics of key variables by geographic area. Similar to Table 3, average age and height of the individuals stopped and share of female stopped do not vary much across the five boroughs in New York City. In Brooklyn the mean force is as low as 17.3% while in Bronx it is as high as 30.3%. This suggests there is a geographic variability in police behaviour. Blacks are the highest share across all geographic areas, followed by Hispanics, other race and white. In Manhattan on average 24.3% of the population is black.

However, the share of blacks stopped in Manhattan is 52.8%, which is more than twice the percentage of black population in Manhattan. A similar discrepancy can be seen in Staten Island where the share of blacks stopped is 38.3% and percentage of black population is only 16.0%.

6. Empirical Model

A logit model is used to analyze whether or not there is any evidence of racial profiling in the use of police force in the stop and frisk policy in New York City. The following equation is used for my estimation:

$$F_{it} = \beta_0 + \beta_1 R_{it} + \beta_2 SC_{it} + \beta_3 RS_{it} + \beta_4 Y_i + \beta_5 GA_{it} + \beta_6 CR_{it} + \beta_7 PC_{it} + \varepsilon_{it}$$

In this equation, F_{it} is a binary variable that indicates whether or not any force is used on individual i in time t . The following are nine types of physical force used by officers: suspect against wall, weapon pointed, hands, handcuffs, suspect on ground, weapon drawn, baton, and pepper spray. The dependent variable force is 1 if any type of force is used and 0 otherwise.

R_{it} is a vector of the race of individual i in time t . Suspect race includes black, white, Hispanics and other.

SC_{it} is a vector of the individual level characteristics of individual i in time t . The suspect characteristics include suspect sex, age and height.

RS_{it} is a vector of the reasons that the police use to stop individual i in time t . The following are the eight reasons for stop: carrying a suspicious object, fits a relevant description suspect acting as a lookout, casing a victim or location, actions indicative of a drug transaction, wearing clothes commonly used as a lookout, furtive movements, and actions of engaging in a violent crime.

Y_{it} is the year of stop for individual i . The period is from 2006 to 2013.

GA_{it} is a vector of the geographic area of stop for individual i in time t .

CR_{it} is the crime rate of the precinct where individual i was stopped in time t . It is measured as crimes per 100 people in the population.

PC_{it} is a vector of the characteristics of the precinct where individual i was stopped. The precinct characteristics include log of average household income, unemployment rate for civilian population in labour force, percentage in the population doing poorly, percentage in the population struggling, percentage of black in the population.

ε_{it} is the error term for individual i in time t .

In this model, suspect characteristics such as sex, age, and height are the encounter level variables. Other models in the literature that have analyzed police-suspect encounters have included officer characteristics such as race and experience to better understand the relationship between encounter level variables and use of force (Terill et Al., 2006). However, such variables are unavailable in the Stop and Frisk database and may lead to the problem of omitted variable bias.

The reasons for stop are independent variables that are typically used for research that relies on the direct observation of police behaviour. However, one of the limitations of typical administrative dataset such as the Stop and Frisk database is that the reasons officers used to articulate their actions are vulnerable to numerous validity threats.

As previously mentioned in the literature review the ecological contamination hypothesis states that police attach the socioeconomic characteristics of the neighbourhood to an individual

suspect independent of his/her demographics (Werthman et al., 1926). In order to analyze this neighbourhood context of police behaviour, the study includes precinct level characteristics such as log of average household income, unemployment rate, percentage in the population doing poorly, percentage in the population struggling, percentage of black in the population in my model. The log transformation of average household income is necessary because income is positively skewed. It also leads to easier interpretation of the coefficients.

7. Results and Findings

7.1. Base Specification

Table 5 shows the logit results and marginal effects of the base specification model. As described in the empirical model, the logit model is used to estimate the likelihood of force being applied on individuals during a stop and frisk encounter in New York City. The estimation suggests that suspect race, suspect characteristics, reasons for stop, geographic area, year, crime rate and precinct level characteristics are determinants of force. . The logit results suggests Hispanics are more likely to have force used on them, followed by blacks. The coefficient signs of the base model are as expected. For instance, females are less likely to have force used on them male. Likelihood of force decreases as age of the suspect increases. The probability of force also increases as crime rate and percentage of black population of the precinct where the suspect was located increases. The probability decreases if the income of the precinct increases.

The marginal effects is calculated to interpret the results of the baseline specification. The marginal effect for categorical variables shows how the likelihood of force changes as the categorical variable changes from 0 to 1. Intuitively, the average marginal effect is calculated as follows. We first go to the first individual and treat him/her as white, regardless of what the

individual's race is, leave all the variables as is and compute the probability that individual will have forced used on him/her. The same computation is then done, treating the individual as black. The marginal effect for that individual is the difference between the two probabilities just computed. The process is repeated for every individual in the sample. The average marginal effect of black is the average of all the marginal effects computed.

The results of the marginal effects of the baseline specification are shown in Table 5. On average the probability of having force used on blacks and Hispanics is respectively 3.7 and 3.8 percentage points higher than it is for whites. The average marginal effects for continuous variables such as crime rate tells us the instantaneous rate of change for crime rate. Therefore, for every 1 crime per 100 in the population the probability of force increases by 0.1 percentage points. The probability of force increases by 1.1 percentage points for every 1 unit increase in the percentage of black population (scaled by 100). Similarly, for every one unit increase in unemployment rate and percentage in population doing poorly the likelihood of force increases by 0.3 and -0.3 percentage points respectively. Furthermore, for every 1% increase in average household income the probability of force increases by 0.4 percentage points. Compared to individuals stopped in 2006, those stopped in 2009 are 3.3 percentage points less likely to have forced used on them. However, individuals stopped in 2013 are 2.8 percentage points less likely to have forced used on them compared to 2006. Individuals stopped in Manhattan have a 6.2 percentage points higher likelihood of force being used on them compared to those stopped in Brooklyn. Similarly, in Staten Island the likelihood of force is lower by 4.3 percentage points. The next sub section describes a model specification that analyzes the interaction between suspect race and crime rate.

7.2. Model Specification 1: Interaction of Suspect Race with Crime Rate

The motivation for this model specification was derived from the models in Table 6 where the sample was split into four crime rate levels and the base model was run for each of these stratified samples. The levels are low, very low, high and very high crime and they represent crime rates below the 25th percentile, between 25th and 50th, between 50th and 75th and above 75th respectively. According to the results in Table 6, it can be seen that the coefficients on suspect race Black and Hispanic vary across the four models. The coefficient for black and Hispanic is highest in the model for very low crime rate, followed by the model for low crime rate. The coefficient on these suspect races is lowest in the model for very high crime rate. These results suggest an interaction between race of the suspect and crime rate of the precinct where the suspect was stopped. In order to understand this interaction, I have developed model specification 1 which is essentially the same as the base specification, except that I have added an interaction term between suspect race and crime rate. The results of model specification 1 can be found in Table 7.

Table 7 shows that for whites the probability of force increases as crime rate increases. When crime rate in the precinct where the individual is stopped is zero the coefficients on black and white are 0.322 and 0.292 respectively. Blacks are more likely to have force used on them in low crime rate precincts, followed by Hispanics. Moreover, the coefficients on the interaction terms for black and crime rate, Hispanic and crime rate are -0.032 and -0.019, the decrease being higher for blacks. This implies that the difference in the probability of force between blacks, Hispanics and whites is highest in low crime rate precincts and this difference decreases in precincts with higher crime rates.

Table 7 also shows the marginal effects for the model specification with the interaction term. Individuals stopped in 2013 are 2.9 percentage points less likely to have force used on them compared to those stopped in 2006. The magnitude of the marginal effects for Black and Hispanics are still positive. However, the magnitude of the marginal effect for blacks and Hispanics decreases after taking into account the interaction between suspect race and crime rate. According to this model specification, on average the probability of having force used on blacks and Hispanics is respectively 2.0 and 1.9 percentage points higher than it is for whites. For every one unit increase in unemployment rate and percentage in population doing poorly the likelihood of force increases by 0.3 and decreases by 0.3 percentage points. The likelihood of force increases by 0.5 percentage points for every 1 unit increase in the percentage in the population struggling. For the base model specification this magnitude was zero. Furthermore, for every 1% increase in average household income the probability of force decreases by 1 percentage point. Like the base model's parameter, this model specification has a negative sign for the marginal effect on income and the negative sign is consistent with the intuition that the likelihood of force is lower in rich neighbourhoods. . Last but not the least, for every 1 crime per 100 in the population the probability of force increases by 0.3 percentage points, the magnitude of marginal effect on crime being higher for this model specification than that of the base model.

7.3. Model Specification 2

The model specification 2 is a multinomial logit that aims to analyze if the extent to which force is used on individuals varies by race. Previous research has ranked force in different ways, such as excessive vs non-excessive, impact vs non-impact, and no, low, moderate and high force. In this study force is categorized as no, low and high force. The independent variables for the multinomial logit is the same as the base specification model described in the empirical section.

Force is categorized as 0 if no force is used. It is categorized as low force 1 if only handcuffs and/or hands are used. It is categorized as high force 2 if at least one of the following types of force was used: suspect against wall, weapon pointed, suspect on ground, weapon drawn, baton and pepper spray. Police often used more than the one force on a suspect. For this analysis, force is high as long as any of the above mentioned types of force is applied. The dynamics of force within an encounter is beyond the scope of this research.

Table 8 shows the results of the model specification 2. The multinomial logit for black relative to whites is 0.264 higher for being in low force relative to no force given all other predictor variables in the model are held constant. The magnitude of the multinomial logit for Hispanics relative to whites for being in low force relative no force is the same. Furthermore, the multinomial logit for black relative to whites is 0.193 higher for being in high force relative to no force. Similarly the multinomial logit for Hispanics relative to whites for being in high force relative no force is 0.219.

Table 8 also shows the relative risk ratio of the model specification 2. These figures are obtained by exponentiating the multinomial logit coefficients, $e^{\text{coef.}}$, or by specifying the rrr

option in STATA. According to the relative risk ratio results, for blacks relative to white, the relative risk for low force relative to no force would be expected to increase by a factor of 1.302 given the other variables in the model are held constant. For Hispanics relative to white, the relative risk for low force relative to no force 1.303. For blacks relative to white, the relative risk for high force relative to no force would be expected to increase by a factor of 1.213 given the other variables in the model are held constant. For Hispanics relative to white, the relative risk for high force relative to no force 1.245. The results from this multinomial logit shows that black and Hispanics are more likely to have both low and high force used on them compared to white. However, the relative risk for high force relative to no force is not significantly higher than low force relative to no force.

7.4. Model Specification 3

This model specification is a multinomial logit with the same categorical force as the multinomial logit described above. The dependent variable is the same as the previous model specification, except an interaction term is added between crime rate and suspect race.

Table 9 shows the relative risk ratio of the model specification 3. When crime rate is zero, for blacks the relative risk for low force relative to no force increases by a factor of 2.117 given the other variables in the model are held constant and for Hispanics the relative risk for low force relative to no force increases by 1.964. If crime rate per 100 increases by 1 unit, for white the relative risk for low force relative to no force increases by 1.230 given the other variables in the model are held constant. When crime rate increases, for blacks the relative risk for low force relative to no force decreases by a factor of 0.791 given the other variables in the model are held constant and for Hispanics the relative risk for low force relative to no force decreases by 0.816.

The relative risk ratio results for high force relative to no force are as follows. When crime rate is zero, for blacks the relative risk for high force relative to no force increases by a factor of 1.895 given the other variables in the model are held constant and for Hispanics the relative risk for high force relative to no force increases by 1.596. If crime rate per 100 increases by 1 unit, for white the relative risk for high force relative to no force increases by 1.222 given the other variables in the model are held constant. When crime rate increases, for blacks the relative risk for high force relative to no force decreases by a factor of 0.816 given the other variables in the model are held constant and for Hispanics the relative risk for high force relative to no force decreases by 0.878.

8. Conclusion

The probability of having force used on an individual during a Stop and Frisk policy is 16.4%, 22.2% and 23.8% for whites, blacks, and Hispanics. So there is a difference of 5.8% and 7.4% between black and whites and Hispanics and whites respectively. This study finds that after controlling for encounter level characteristics such as reasons for stop, suspect level characteristics such as age, height and precinct level characteristics such as crime rate, percentage of black population, etc the differential probability of force between whites and blacks and whites and Hispanics is still 3.8% and 3.9% respectively. This implies there is some evidence of racial profiling in the police use of force in the New York Stop and Frisk policy. Furthermore, this evidence of racial profiling is higher in precincts with the low crime rates.

The results of this study contradict with that of Smith's (1986) who claim that police officers are more likely to use force on black suspects and this effect was reduced when the neighbourhood context was taken into account. In this study, the effect of race is not mitigated when neighbourhood variables are taken into account. In fact, the effect is more prominent when

the interaction of crime rate and race is taken into account. Police officers are more likely to use force on black and Hispanics in precincts with low crime rate. This could be because they believe that that these individuals are up to something bad and this level of suspicion is enhanced since the suspect do not belong in the area. Officers may reason that this person may be in this area to score his or her next high or to meet with someone engaged in the illegal behaviour. Another explanation of this result is that high crime rate areas are mostly policed by black and Hispanic officers. These officers are more familiar with the area and the people living in the neighbourhood. So they are less likely to use force on black and Hispanics based solely on the race of the suspect. This claim could be investigated if the race of the police officers during each Stop and Frisk policy were available.

From 2006 to 2013 approximately 4 million individuals in New York City were stopped by the police, out of which 53% were blacks and 32% were Hispanics. Some of the social costs of the Stop and Frisk policy are increased cultural strife between police and minorities, mistrust of institutions, psychological effects such as humiliation and alienation, and decreased sense of citizenship. Any evidence of racial bias in the police use of force raises important questions about the Stop and Frisk policy in New York that affected approximately 3.4 million blacks and Hispanics in 8 years. This study can have some meaningful implications for the debate surrounding the Stop and Frisk policy in New York City.

Bibliography

Andrew Gelman, Alex Kiss, Jeffrey Fagan. "An Analysis of the NYPD's Stop-And-Frisk Policy in the Context of Claims of Racial Bias" *Columbia Public Law Research Paper No. 05-95*. (2006): <http://ssrn.com/abstract=846365> or <http://dx.doi.org/10.2139/ssrn.846365>

Goel, Sharad, Justin M. Rao, and Ravi Shro. 2012 "Precinct or Prejudice?: Understanding Racial Disparities in New York City's Stop-and-Frisk Policy". Accessed November 2, 2014, <https://5harad.com/papers/frisky.pdf>

Ridgeway, G. 2007. "Analysis of Racial Disparities in the New York Police Department's Stop, Question and Frisk Policy Practices". Technical report prepared for the New York Police Department. Accessed November 2, 2014, http://www.rand.org/content/dam/rand/pubs/technical_reports/2007/RAND_TR534.pdf

Smith, Douglas A. 1986. "The Neighbourhood Context of Police Behaviour." *Communities and Crime*, edited by Albert J. Reiss, Jr., and Michael Tonry. Chicago: University of Chicago Press.

New York State Office of Attorney General, *An Investigation into NYPD's "Stop and Frisk" Investigation*, 1999. Accessed November 2, 2014, http://www.oag.state.ny.us/sites/default/files/pdfs/bureaus/civil_rights/stp_frsk.pdf

William Terrill, Michael D. Reisig. "Neighbourhood Context and Police Use of Force" *JOURNAL OF RESEARCH IN CRIME AND DELINQUENCY* 40, No. 3 (2003): 291-321, doi: 10.1177/0022427803253800

Short name	Variable name	Long definition	Sources
force=1 if applied force	force	There are nine types of physical force used by officer. They are as follows as suspect against wall, weapon pointed, hands, handcuffs, suspect on ground, weapon drawn, baton, pepper spray and other. Force is 1 if any type of force is used and 0 otherwise.	Stop and Frisk Database
force categorical=0 if no force,=1 if low,=2 high	force_categorical	Force is categorized as 0 if no force is used. It is categorized as low force 1 if only handcuffs and/or hands are used. It is categorized as high force 2 if at least one of the following types of force was used: suspect against wall, weapon pointed, suspect on ground, weapon drawn, baton and pepper spray.	Stop and Frisk Database
Suspect is female	female	Sex of suspect.	Stop and Frisk Database
Suspect age	Age	Age of suspect in years	Stop and Frisk Database
Suspect height	suspectheight	Height of suspect in feet	Stop and Frisk Database
Suspect race is black	race_black	Race of suspect is black	Stop and Frisk Database
Suspect race is white	race_white	Race of suspect is white	Stop and Frisk Database
Suspect race is Hispanic	race_hisp	Race of suspect is Hispanic, includes both white and black Hispanics	Stop and Frisk Database
Suspect race is other	race_oth	Race of suspect is other race, includes Asian, Native American and other	Stop and Frisk Database
Reason for stop object	stoppedbcobject	<i>carrying a suspicious object</i> as reason to stop individual	Stop and Frisk Database
Reason for stop description	stoppedbcdesc	<i>fits a relevant description</i> as reason to stop individual	Stop and Frisk Database
Reason for stop casing	stoppedbccasing	<i>casing a victim or location</i> as reason to stop individual	Stop and Frisk Database
Reason for stop lookout	stoppedbclookout	<i>suspect acting as a lookout</i> as reason to stop individual	Stop and Frisk Database
Reason for stop clothing	stoppedbcclothing	<i>wearing clothes commonly used as a lookout</i> as reason to stop individual	Stop and Frisk Database
Reason for stop drugs	stoppedbcdrugs	<i>actions indicative of a drug transaction</i> as reason to stop individual	Stop and Frisk Database
Reason for stop furtive	stoppedbcfurtive	<i>furtive movements</i> as reason to stop individual	Stop and Frisk Database
Reason for stop violence	stoppedbcviolent	<i>actions of engaging in a violent crime</i> as reason to stop individual	Stop and Frisk Database
Year of stop	year	Year of stop. The period is from 2006 to 2013	Stop and Frisk Database

Geographic Area	geoarea	Geographic area of stop. The locations of stop are the following five boroughs of New York City: Manhattan, Brooklyn, Queens, Bronx and Staten Island	Stop and Frisk Database
Log of Average Household Income	log_average_household_income	Log of average household income in 2012 inflation adjusted dollars in precinct	American Community Survey (ACS) 2008 -2012
Unemployment Rate	unemployment_rate	Unemployment rate for civilian population in labor force 16 years And over	American Community Survey (ACS) 2008 -2012
Percentage in Population Doing Poorly	poverty_doing_poorly	Percentage of population for whom poverty status is determined: Under 1.00 (Doing Poorly). Here poverty status is determined by ratio of income in 2012 to poverty level.	American Community Survey (ACS) 2008 -2012
Percentage in Population Struggling	poverty_struggling	Population for whom poverty status is determined: 1.00 to 1.99 (Struggling). Here poverty status is determined by ratio of income in 2012 to poverty level.	American Community Survey (ACS) 2008 -2012
Crime Rate per 100	crime_rate_14_major	Crime rate per 100 people in each precinct. It is calculated by adding the total number of seven major felonies and non-seven major felony crimes of each precinct, dividing it by the respective population of the precinct and multiplying it by 100. The seven major felonies include man slaughter and non-negligent murder, rape, robbery, felony assault, burglary, grand larceny and grand larceny of motor vehicles. The non-seven major felony crimes include felony possession stolen property, forgery/theft-fraud/identity-theft, arson, felony sex crimes, felony dangerous drugs, felony dangerous crimes, felony criminal mischief and related offenses, and other felonies.	Crime Statistics (NYPD database) and American Community Survey (ACS) 2008 -2012
Percentage of Black Population /100	precinct_black00	Percentage of population in precinct who are Black.	American Community Survey (ACS) 2008 -2012

Table 1: Probability of force being applied on an individual broken down by race for each borough and for the whole city

	<i>All</i>	<i>White</i>	<i>Black</i>	<i>Hispanics</i>
<i>All</i>	0.216	0.164	0.222	0.238
<i>Manhattan</i>	0.222	0.187	0.239	0.211
<i>Brooklyn</i>	0.173	0.134	0.177	0.176
<i>Queens</i>	0.232	0.175	0.238	0.256
<i>Bronx</i>	0.303	0.244	0.303	0.308
<i>Staten Island</i>	0.181	0.155	0.213	0.184

Table 2: Summary Statistics for Each Variable in the Base Specification Model

<i>Variable</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Force	0.216	0.412	0	1
Suspect is female	0.071	0.257	0	1
Suspect age	27.940	11.428	10	80
Suspect height	5.717	0.268	3	7.917
White	0.098	0.300	0	1
Black	0.533	0.499	0	1
Hispanic	0.316	0.465	0	1
Other	0.052	0.221	0	1
Reasons for stop object	0.026	0.158	0	1
Reasons for stop description	0.167	0.373	0	1
Reasons for stop casing	0.300	0.458	0	1
Reasons for stop lookout	0.174	0.379	0	1
Reasons for stop clothing	0.045	0.207	0	1
Reasons for stop drugs	0.089	0.285	0	1
Reasons for stop furtive	0.474	0.499	0	1
Reasons for stop violence	0.089	0.285	0	1
Log of average household income	15.414	0.582	14.077	17.319
Unemployment Rate	11.514	3.333	4.962	19.558
Percentage of Population Doing Poorly	23.885	10.150	5.812	45.786
Percentage of Population Struggling	21.121	5.788	5.396	31.290
Crime Rate per 100	2.580	1.044	0.695	6.457
Percentage of Black Population	34.579	26.627	1.140	90.980

Source: Stop and Frisk Database, American Community Survey (ACS) 2008 -2012 and Crime Statistics, NYPD database,

Notes: The number of observations is 972931, 25% of the original sample.

Table 3: Summary Statistics by Crime Rate

	<i>Very low</i>	<i>Low</i>	<i>High</i>	<i>Very high</i>
Number of Observations	239379	247190	232784	258050
Force	0.210 (0.407)	0.211 (0.408)	0.256 (0.437)	0.203 (0.402)
Suspect is female	0.065 (0.246)	0.064 (0.245)	0.075 (0.264)	0.081 (273)
Suspect age	27.058 (10.965)	27.403 (11.143)	28.280 (11.440)	28.990 (12.012)
Suspect height	5.693 (0.264)	5.719 (0.264)	5.726 (0.267)	5.728 (0.275)
Black	0.268 (0.443)	0.549 (0.498)	0.595 (0.491)	0.707 (0.455)
White	0.229 (0.420)	0.077 (0.267)	0.062 (0.242)	0.035 (0.184)
Hispanics	0.405 (0.491)	0.330 (0.470)	0.305 (0.461)	0.230 (0.421)
Other	0.098 (0.298)	0.044 (0.205)	0.037 (0.190)	0.029 (0.167)
Manhattan	0.105 (0.306)	0.217 (0.412)	0.212 (0.409)	0.255 (0.436)
Brooklyn	0.191 (0.393)	0.395 (0.489)	0.289 (0.453)	0.515 (0.500)
Queens	0.580 (0.494)	0.179 (0.384)	0.170 (0.375)	0.008 (0.091)
Bronx	0.047 (0.212)	0.204 (0.403)	0.217 (0.412)	0.222 (0.415)
Staten Island	0.078 (0.268)	0.005 (0.068)	0.112 (0.316)	0.000 (0.000)
Log of average household income	15.969 (0.443)	15.416 (0.502)	15.312 (0.399)	14.989 (0.493)
Percentage of Black Population	11.682 (16.400)	34.396 (26.566)	38.127 (20.964)	52.792 (23.115)

Source: Stop and Frisk Database and American Community Survey (ACS) 2008 -2012

Note: Standard error in parentheses. The sample is split into four crime rate levels. The levels are low, very low, high and very high crime and they represent crime rates below the 25th percentile, between 25th and 50th, between 50th and 75th and above 75th respectively.

Table 4: Summary Statistics by Geographic Area

	<i>Manhattan</i>	<i>Brooklyn</i>	<i>Queens</i>	<i>Bronx</i>	<i>Staten Island</i>
Total Number of Observations	212068	343647	224760	169444	45953
Force	0.222 (0.416)	0.173 (0.378)	0.232 (0.422)	0.303 (0.459)	0.181 (0.385)
Suspect is female	0.080 (0.271)	0.070 (0.256)	0.057 (0.233)	0.072 (0.259)	0.113 (0.316)
Suspect age	30.711 (12.523)	27.941 (11.552)	26.983 (10.635)	26.860 (10.802)	26.845 (10.813)
Suspect height	5.730 (0.273)	5.724 (0.269)	5.700 (0.263)	5.713 (0.266)	5.710 (0.271)
Black	0.528 (0.499)	0.659 (0.474)	0.411 (0.492)	0.487 (0.500)	0.383 (0.486)
White	0.093 (0.290)	0.094 (0.292)	0.111 (0.314)	0.033 (0.180)	0.382 (0.486)
Hispanic	0.337 (0.473)	0.215 (0.411)	0.369 (0.483)	0.445 (0.497)	0.205 (0.404)
Other	0.042 (0.201)	0.032 (0.176)	0.109 (0.311)	0.034 (0.181)	0.030 (0.171)
Log of average household income	15.116 (0.751)	15.442 (0.328)	15.759 (0.508)	15.120 (0.570)	15.768 (0.150)
Crime Rate per 100	2.882 (1.097)	2.849 (1.025)	1.765 (0.572)	2.887 (0.954)	2.161 (0.798)
Percentage of Black Population	24.347 (22.220)	47.677 (29.716)	24.636 (25.794)	35.856 (12.384)	16.006 (11.111)

Source: Stop and Frisk Database, American Community Survey (ACS) 2008 -2012 and Crime Statistics (NYPD database)

Note: Standard error in parentheses. The sample is split into geographic area of stop. The locations of stop are the following five boroughs of New York City: Manhattan, Brooklyn, Queens, Bronx and Staten Island

Table 5: Logit Results and Marginal Effect for Base Specification Model

<i>VARIABLES</i>	<i>Base</i>	<i>Marginal Effects</i>
Black	0.236*** (0.010)	0.037
Hispanic	0.246*** (0.010)	0.038
Other	-0.002 (0.015)	-0.000
Suspect is female	-0.519*** (0.012)	-0.085
Suspect age	-0.010*** (0.000)	-0.002
Suspect height	0.146*** (0.010)	0.024
Reasons for stop object	0.401*** (0.015)	0.065
Reasons for stop description	0.534*** (0.007)	0.087
Reasons for stop casing	-0.055*** (0.006)	-0.009
Reasons for stop lookout	-0.104*** (0.007)	-0.017
Reasons for stop clothing	0.216*** (0.011)	0.035
Reasons for stop drugs	-0.086*** (0.009)	-0.014
Reasons for stop furtive	0.467*** (0.005)	0.076
Reasons for stop violence	0.492*** (0.008)	0.080
2007	0.162*** (0.010)	0.027
2008	0.155*** (0.010)	0.026
2009	0.194*** (0.010)	0.033
2010	0.086*** (0.010)	0.014
2011	-0.023** (0.010)	-0.004
2012	-0.313*** (0.011)	-0.046

2013	-0.186*** (0.014)	-0.028
Manhattan	0.398*** (0.009)	0.062
Queens	0.308*** (0.008)	0.047
Bronx	0.674*** (0.009)	0.113
Staten Island	0.282*** (0.014)	0.043
Log of Average Household Income	-0.068*** (0.008)	-0.011
Unemployment Rate	0.020*** (0.001)	0.003
Percentage in Population Doing Poorly	-0.018*** (0.001)	-0.003
Percentage in Population Struggling	0.027*** (0.001)	0.004
Crime Rate per 100	0.004*** (0.001)	0.001
Percentage of Black Population /100	0.070*** (0.014)	0.011
Constant	-2.076*** (0.146)	

Robust Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Race white, Geographic Area Brooklyn and Year 2006 are omitted

Number of observations is 995,871

Table 6: Logit results for Base Model by Crime Rate

<i>VARIABLES</i>	<i>Base</i>	<i>Very low Crime Rate p<25</i>	<i>Low Crime Rate 25<p<50</i>	<i>High Crime Rate 50<p<75</i>	<i>Very high Crime Rate p>75</i>
Black	0.240*** (0.0146)	0.273*** (0.0247)	0.195*** (0.0313)	0.0364 (0.0322)	0.0816** (0.0412)
Hispanic	0.245*** (0.0147)	0.317*** (0.0228)	0.204*** (0.0318)	-0.0279 (0.0334)	0.118*** (0.0427)
Other	0.00855 (0.0211)	0.0254 (0.0316)	0.0186 (0.0470)	-0.165*** (0.0485)	0.0750 (0.0578)
Suspect is female	-0.523*** (0.0170)	-0.439*** (0.0361)	-0.477*** (0.0357)	-0.572*** (0.0326)	-0.571*** (0.0327)
Suspect age	-0.00927*** (0.000332)	-0.00877*** (0.000723)	-0.0111*** (0.000694)	-0.0109*** (0.000650)	-0.00816*** (0.000629)
Suspect height	0.135*** (0.0142)	0.0794*** (0.0301)	0.167*** (0.0290)	0.152*** (0.0280)	0.134*** (0.0278)
Reasons for stop object	0.422*** (0.0216)	0.431*** (0.0446)	0.408*** (0.0440)	0.287*** (0.0426)	0.517*** (0.0430)
Reasons for stop description	0.536*** (0.00932)	0.564*** (0.0185)	0.585*** (0.0183)	0.412*** (0.0189)	0.570*** (0.0197)
Reasons for stop casing	-0.0546*** (0.00875)	-0.00519 (0.0167)	-0.0245 (0.0179)	-0.0732*** (0.0179)	-0.107*** (0.0185)
Reasons for stop lookout	-0.0974*** (0.0103)	-0.0376** (0.0189)	-0.143*** (0.0213)	-0.131*** (0.0213)	-0.108*** (0.0223)
Reasons for stop clothing	0.237*** (0.0159)	0.207*** (0.0331)	0.398*** (0.0319)	0.223*** (0.0304)	0.108*** (0.0331)
Reasons for stop drugs	-0.0733*** (0.0130)	0.109*** (0.0302)	-0.00548 (0.0260)	-0.149*** (0.0249)	-0.121*** (0.0247)
Reasons for stop furtive	0.472*** (0.00740)	0.512*** (0.0154)	0.523*** (0.0149)	0.400*** (0.0145)	0.452*** (0.0149)
Reasons for stop viol	0.493*** (0.0115)	0.506*** (0.0214)	0.480*** (0.0237)	0.402*** (0.0236)	0.569*** (0.0242)
2007	0.146*** (0.0146)	0.334*** (0.0389)	0.289*** (0.0295)	-0.0801*** (0.0299)	0.111*** (0.0250)
2008	0.156*** (0.0141)	0.213*** (0.0374)	0.364*** (0.0287)	-0.263*** (0.0283)	0.221*** (0.0251)

2009	0.188*** (0.0139)	0.314*** (0.0356)	0.265*** (0.0305)	-0.280*** (0.0282)	0.330*** (0.0262)
2010	0.0806*** (0.0140)	0.254*** (0.0354)	0.0377 (0.0305)	-0.169*** (0.0274)	0.0419 (0.0290)
2011	-0.0282** (0.0138)	0.0719** (0.0357)	-0.0761*** (0.0293)	-0.196*** (0.0273)	-0.0301 (0.0268)
2012	-0.317*** (0.0151)	-0.182*** (0.0380)	-0.432*** (0.0321)	-0.442*** (0.0298)	-0.265*** (0.0293)
2013	-0.193*** (0.0204)	-0.0718 (0.0452)	-0.135*** (0.0385)	-0.607*** (0.0485)	-0.135*** (0.0432)
Manhattan	0.407*** (0.0127)	0.635*** (0.0354)	-0.111*** (0.0254)	0.693*** (0.0319)	0.730*** (0.0373)
Queens	0.307*** (0.0119)	0.445*** (0.0223)	-0.0342 (0.0243)	0.154*** (0.0379)	0.0401 (0.105)
Bronx	0.675*** (0.0126)	0.815*** (0.0395)	0.212*** (0.0231)	1.037*** (0.0288)	0.511*** (0.0498)
Staten Island	0.289*** (0.0203)	0.794*** (0.0450)	0.279*** (0.107)	0.287*** (0.0296)	
Log of Average Household Income	-0.0589*** (0.0111)	0.158*** (0.0238)	-0.124*** (0.0250)	0.493*** (0.0357)	-0.112*** (0.0311)
Unemployment Rate	0.0201*** (0.00208)	-0.00978* (0.00505)	0.0611*** (0.00395)	0.0744*** (0.00626)	0.0754*** (0.00547)
Percentage of Population Doing Poorly	-0.0191*** (0.000948)	0.0404*** (0.00268)	-0.00607*** (0.00174)	-0.0275*** (0.00285)	-0.0150*** (0.00292)
Percentage of Population Struggling	0.0282*** (0.00126)	0.0270*** (0.00303)	-0.0207*** (0.00277)	0.0261*** (0.00325)	0.00229 (0.00419)
Crime Rate per 1000	0.00219*** (0.000601)				
Percentage of Black Population	0.000673*** (0.000213)	0.00739*** (0.000603)	0.000907** (0.000366)	-0.000297 (0.000508)	-0.00274*** (0.000748)
Constant	-2.207*** (0.208)	-6.391*** (0.454)	-0.838* (0.447)	-10.47*** (0.623)	-1.459*** (0.556)
Observations	488,766	119,742	123,557	116,476	128,991

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Race white, Geographic Area Brooklyn and Year 2006 are omitted

Table 7: Logit results and Marginal Effects for Model Specification with Interaction Term between Race and Crime Rate (Model Specification 1)

<i>VARIABLES</i>	<i>Model Specification 1</i>	<i>Marginal Effects</i>
Black	0.322*** (0.013)	0.020
Hispanic	0.292*** (0.013)	0.019
Other	0.043** (0.020)	-0.013
Crime Rate per 100	0.027*** (0.003)	0.003
Black # Crime Rate	-0.032*** (0.003)	
Hispanic # Crime Rate	-0.019*** (0.003)	
Race # Crime Rate	-0.018*** (0.005)	
Suspect is female	-0.520*** (0.012)	-0.086
Suspect age	-0.010*** (0.000)	-0.002
Suspect height	0.145*** (0.010)	0.023
Reasons for stop object	0.399*** (0.015)	0.063
Reasons for stop description	0.535*** (0.007)	0.087
Reasons for stop casing	-0.054*** (0.006)	-0.008
Reasons for stop lookout	-0.104*** (0.007)	-0.017
Reasons for stop clothing	0.216*** (0.011)	0.035
Reasons for stop drugs	-0.086*** (0.009)	-0.014
Reasons for stop furtive	0.468*** (0.005)	0.077
Reasons for stop violent	0.492*** (0.008)	0.080
2007	0.162*** (0.010)	0.027

2008	0.155*** (0.010)	0.026
2009	0.193*** (0.010)	0.033
2010	0.084*** (0.010)	0.014
2011	-0.024** (0.010)	-0.004
2012	-0.314*** (0.011)	-0.047
2013	-0.187*** (0.014)	-0.029
Manhattan	0.395*** (0.009)	0.059
Queens	0.307*** (0.008)	0.046
Bronx	0.670*** (0.009)	0.111
Staten Island	0.286*** (0.014)	0.045
Log of Average Household Income	-0.067*** (0.008)	-0.010
Unemployment Rate	0.020*** (0.001)	0.003
Percentage of Population Doing Poorly	-0.018*** (0.001)	-0.003
Percentage of Population Struggling	0.027*** (0.001)	0.005
Percentage of Black Population /100	0.062*** (0.015)	0.006
Constant	-2.139*** (0.146)	
Observations	995,871	977,407

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Race white, Geographic Area Brooklyn and Year 2006 are omitted

Table 8: Multinomial Logit Results and Relative Risk Ratios for Model Specification 2

<i>VARIABLES</i>	<i>mlogit results</i>	<i>mlogit results</i>	<i>Relative risk ratio</i>	<i>Relative risk ratio</i>
	<i>Low force</i>	<i>High force</i>	<i>Low force</i>	<i>High force</i>
Black	0.264*** -0.0116	0.193*** -0.022	1.302*** -0.015	1.213*** -0.027
Hispanic	0.264*** -0.0115	0.219*** -0.022	1.303*** -0.015	1.245*** -0.027
Other	0.0374** -0.0163	-0.135*** -0.0337	1.038** -0.017	0.873*** -0.029
Suspect is female	-0.552*** -0.0133	-0.545*** -0.0277	0.576*** -0.008	0.580*** -0.016
Suspect age	0.00844*** -0.000251	-0.0171*** -0.000542	0.992*** 0	0.983*** -0.001
Suspect height	0.130*** -0.011	0.231*** -0.0223	1.139*** -0.012	1.260*** -0.028
Reasons for stop object	0.338*** -0.017	0.639*** -0.0308	1.402*** -0.024	1.894*** -0.058
Reasons for stop description	0.431*** -0.00728	1.019*** -0.0127	1.539*** -0.011	2.769*** -0.035
Reasons for stop casing	-0.0359*** -0.0066	-0.131*** -0.0137	0.965*** -0.006	0.877*** -0.012
Reasons for stop lookout	-0.130*** -0.00782	0.000995 -0.0157	0.878*** -0.007	1.001 -0.016
Reasons for stop clothing	0.198*** -0.0123	0.334*** -0.0228	1.219*** -0.015	1.397*** -0.032

Reasons for stop drugs	-0.121***	0.119***	0.886***	1.126***
	-0.0102	-0.0193	-0.009	-0.022
Reasons for stop furtive	0.475***	0.549***	1.608***	1.732***
	-0.00568	-0.0116	-0.009	-0.02
Reasons for stop violence	0.431***	0.812***	1.538***	2.251***
	-0.00888	-0.0159	-0.014	-0.036
2007	0.196***	0.0437**	1.217***	1.045**
	-0.0112	-0.0217	-0.014	-0.023
2008	0.202***	-0.0245	1.224***	0.976
	-0.0109	-0.0212	-0.013	-0.021
2009	0.241***	0.0278	1.272***	1.028
	-0.0107	-0.0209	-0.014	-0.021
2010	0.122***	-0.0299	1.129***	0.971
	-0.0108	-0.0209	-0.012	-0.02
2011	0.00899	-0.192***	1.009	0.826***
	-0.0106	-0.0209	-0.011	-0.017
2012	-0.297***	-0.495***	0.743***	0.610***
	-0.0117	-0.0233	-0.009	-0.014
2013	-0.162***	-0.233***	0.851***	0.792***
	-0.0158	-0.0304	-0.013	-0.024
Manhattan	0.313***	0.678***	1.368***	1.970***
	-0.0102	-0.019	-0.014	-0.037
Queens	0.361***	0.0403**	1.434***	1.041**
	-0.00923	-0.02	-0.013	-0.021
Bronx	0.628***	0.916***	1.873***	2.499***
	-0.00954	-0.0189	-0.018	-0.047
Staten Island	0.345***	0.159***	1.413***	1.173***
	-0.0159	-0.0313	-0.022	-0.037

Log of Average Household Income	-0.0641*** -0.00889	-0.119*** -0.0176	0.938*** -0.008	0.888*** -0.016
Unemployment Rate	0.0197*** -0.00162	0.0189*** -0.00308	1.020*** -0.002	1.019*** -0.003
Percentage in Population Doing Poorly	-0.0187*** -0.000724	-0.0228*** -0.00142	0.982*** -0.001	0.977*** -0.001
Percentage in Population Struggling	0.0342*** -0.00097	0.0116*** -0.00194	1.035*** -0.001	1.012*** -0.002
Percentage of Black Population/100	0.201*** -0.0168	-0.646*** -0.0343	1.222*** -0.021	0.524*** -0.018
Crime Rate per 100	0.00437 -0.00477	0.0488*** -0.0088	1.004 -0.005	1.050*** -0.009
Constant	-2.478*** -0.165	-2.916*** -0.329	0.084*** -0.014	0.054*** -0.018
Observations	972,931	972,931	972,931 50607.500*** 1.16E+06	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Race white, Geographic Area Brooklyn and Year 2006 are omitted
Base outcome is no force

Table 9: Multinomial Logit Results and Relative Risk Ratios for Model Specification 3

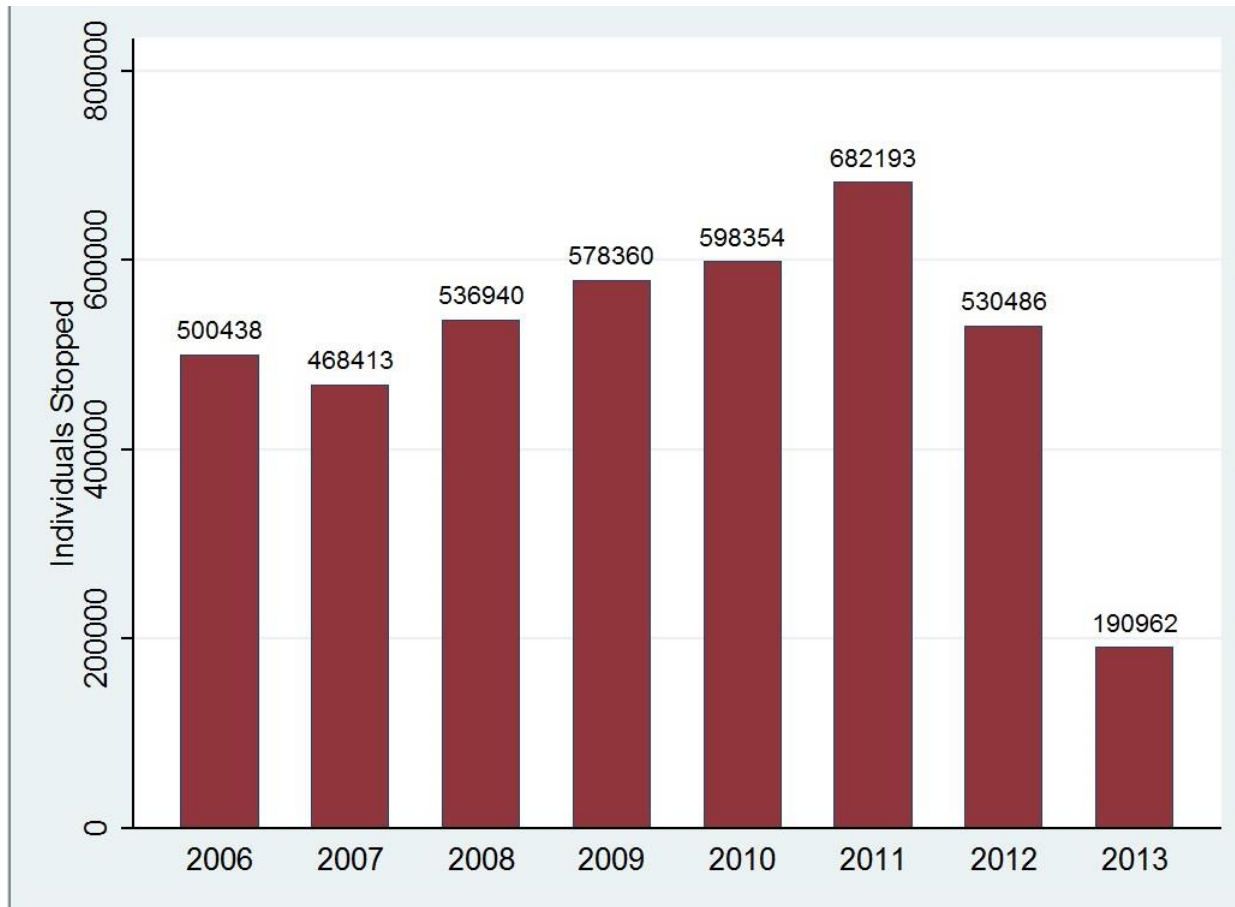
<i>VARIABLES</i>	<i>mlogit results</i>	<i>mlogit results</i>	<i>Relative Risk</i>	<i>Relative Risk</i>
	<i>Low force</i>	<i>High force</i>	<i>Ratio</i> <i>Low force</i>	<i>Ratio</i> <i>High force</i>
Black	0.750*** -0.0246	0.639*** -0.0459	2.117*** -0.052	1.895*** -0.087
Hispanic	0.675*** -0.0251	0.468*** -0.0469	1.964*** -0.049	1.596*** -0.075
Other	0.259*** -0.0372	-0.0837 -0.0745	1.296*** -0.048	0.92 -0.069
Crime Rate per 100	0.207*** -0.01	0.200*** -0.0172	1.230*** -0.012	1.222*** -0.021
Black # Crime Rate	-0.235*** -0.0102	-0.203*** -0.0184	0.791*** -0.008	0.816*** -0.015
Hispanic # Crime Rate	-0.210*** -0.0107	-0.130*** -0.0193	0.811*** -0.009	0.878*** -0.017
Other # Crime Rate	-0.121*** -0.0158	-0.039 -0.03	0.886*** -0.014	0.962 -0.029
Suspect is female	-0.557*** -0.0133	-0.552*** -0.0278	0.573*** -0.008	0.576*** -0.016
Suspect age	-0.00857*** -0.0003	-0.0173*** -0.0005	0.991*** 0	0.983*** -0.001
Suspect height	0.127*** -0.011	0.227*** -0.0223	1.136*** -0.012	1.255*** -0.028
Reasons for stop object	0.333*** -0.017	0.634*** -0.0308	1.395*** -0.024	1.886*** -0.058
Reasons for stop description	0.430*** -0.0073	1.018*** -0.0127	1.538*** -0.011	2.767*** -0.035

Reasons for stop casing	-0.0339*** -0.0066	-0.128*** -0.0137	0.967*** -0.006	0.880*** -0.012
Reasons for stop lookout	-0.128*** -0.0078	0.00353 -0.0157	0.880*** -0.007	1.004 -0.016
Reasons for stop clothing	0.196*** -0.0123	0.332*** -0.0228	1.217*** -0.015	1.394*** -0.032
Reasons for stop drugs	-0.122*** -0.0102	0.118*** -0.0193	0.885*** -0.009	1.125*** -0.022
Reasons for stop furtive	0.476*** -0.0057	0.550*** -0.0116	1.609*** -0.009	1.733*** -0.02
Reasons for stop violence	0.430*** -0.0089	0.811*** -0.0159	1.537*** -0.014	2.250*** -0.036
2007	0.198*** -0.0113	0.0451** -0.0217	1.219*** -0.014	1.046** -0.023
2008	0.203*** -0.0109	-0.024 -0.0212	1.225*** -0.013	0.976 -0.021
2009	0.240*** -0.0107	0.0266 -0.0209	1.271*** -0.014	1.027 -0.021
2010	0.119*** -0.0108	-0.0322 -0.0209	1.127*** -0.012	0.968 -0.02
2011	0.00714 -0.0106	-0.193*** -0.0209	1.007 -0.011	0.824*** -0.017
2012	-0.298*** -0.0117	-0.496*** -0.0233	0.742*** -0.009	0.609*** -0.014
2013	-0.164*** -0.0158	-0.236*** -0.0304	0.849*** -0.013	0.790*** -0.024
Manhattan	0.298*** -0.0102	0.665*** -0.019	1.347*** -0.014	1.944*** -0.037
Queens	0.356*** -0.0092	0.0399** -0.0199	1.428*** -0.013	1.041** -0.021

Bronx	0.611*** -0.0097	0.893*** -0.019	1.842*** -0.018	2.442*** -0.046
Staten Island	0.360*** -0.0158	0.178*** -0.0311	-0.023 0.937***	-0.037 0.890***
Log of Average Household Income	-0.0646*** -0.0089	-0.116*** -0.0177	-0.008 1.021***	-0.016 1.020***
Unemployment Rate	0.0211*** -0.0016	0.0197*** -0.0031	-0.002 0.982***	-0.003 0.978***
Percentage in Population Doing Poorly	-0.0184*** -0.0007	-0.0223*** -0.0014	-0.001 1.035***	-0.001 1.012***
Percentage in Population Struggling	0.0343*** -0.001	0.0122*** -0.0019	-0.001 1.203***	-0.002 0.517***
Percentage of Black Population/100	0.185*** -0.0168	-0.659*** -0.0342	-0.02 0.057***	-0.018 0.039***
Constant	-2.861*** -0.166	-3.256*** -0.329	-0.009	-0.013
Observations	972,931	972,931	972931 51259.970*** 1.16E+06	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Race white, Geographic Area Brooklyn and Year 2006 are omitted
Base outcome is no force

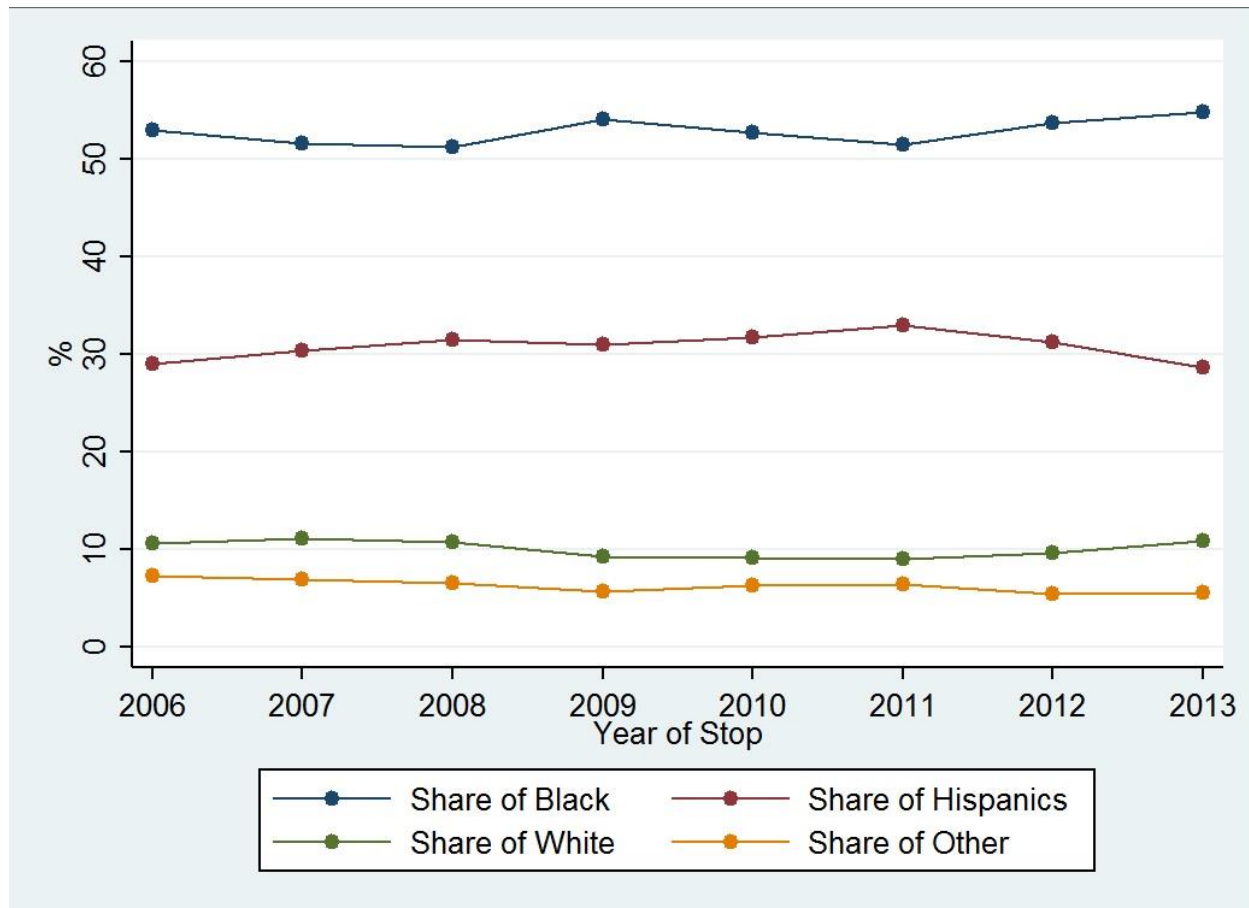
Figure 1: Trend of Total Number of Individuals Stopped by Police



Source: Stop and Frisk Database

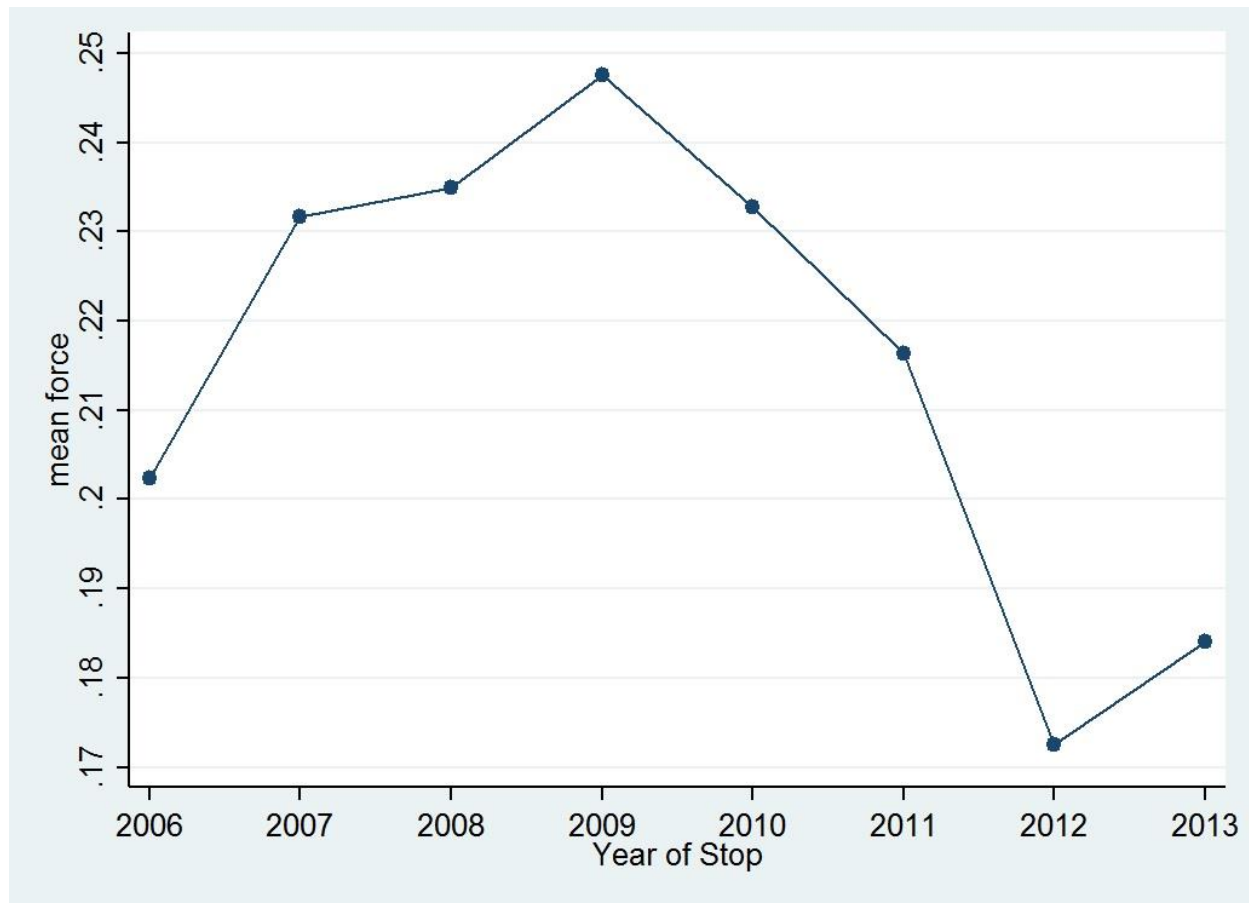
Note: The total number of individuals stopped between 2006 and 2013 is 4,086,146 in the original database.

Figure 2: Racial Composition of Individuals Stopped by Police.



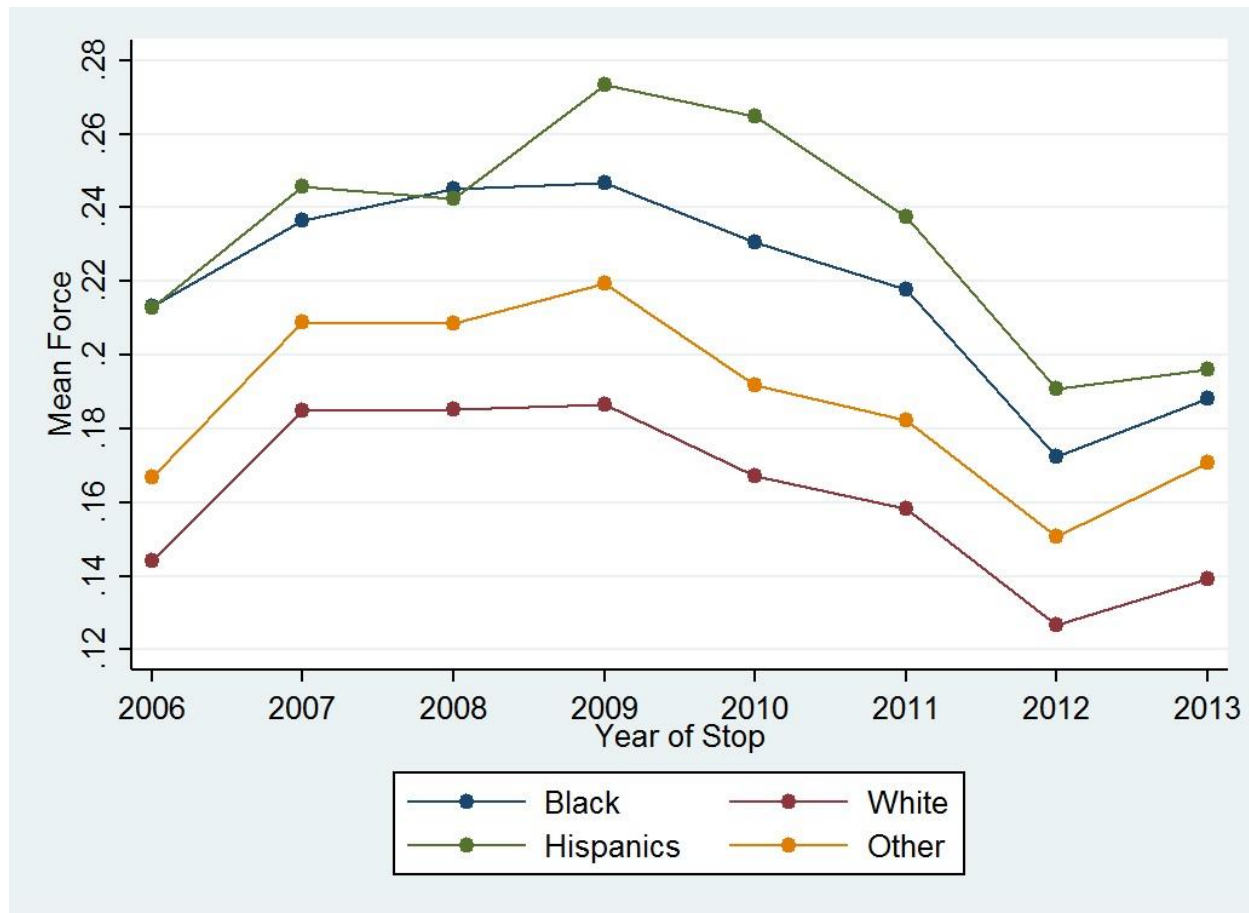
Source: Stop and Frisk Database

Figure 3: Incidence of Force applied by Police



Source: Stop and Frisk Database

Figure 4: Incidence of Force Applied by Police on Each Race



Source: Stop and Frisk Database

ⁱ Smith, Douglas A. 1986. "The Neighbourhood Context of Police Behaviour." *Communities and Crime*, edited by Albert J. Reiss, Jr., and Michael Tonry. Chicago: University of Chicago Press.

ⁱⁱ New York State Office of Attorney General, *An Investigation into NYPD's "Stop and Frisk" Investigation*, 1999. Accessed November 2, 2014, http://www.oag.state.ny.us/sites/default/files/pdfs/bureaus/civil_rights/stp_frsk.pdf

ⁱⁱⁱ Andrew Gelman, Alex Kiss, Jeffrey Fagan. "An Analysis of the NYPD's Stop-And-Frisk Policy in the Context of Claims of Racial Bias" *Columbia Public Law Research Paper No. 05-95*. (2006): <http://ssrn.com/abstract=846365> or <http://dx.doi.org/10.2139/ssrn.846365>

^{iv} Ibid.