The Effects of Highly Publicized Police-Related Deaths on Policing and Crime: Evidence from Large U.S. Cities

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Abstract

This paper examines the effects of the highly-publicized police-related deaths of black civilians from 2014 to 2016 on policing and crime. We compare changes in outcomes in more-black versus less-black cities before and after 2014Q3 when the high-profile incidents began. Results across large U.S. cities indicate that these incidents led to fewer arrests (23.4 percent) and caused short-lived increases in homicides (19.8 percent). A within-city analysis of St. Louis provides similar evidence, showing that the high-profile incidents resulted in reductions in arrests (19 percent) and police self-initiated activities (13.1 percent) as well as short-lived increases in homicides (18.8 percent) in the city's predominantly black communities. These results suggest that highly-publicized police-related deaths lead to de-policing and increases in homicides.

Keywords: highly publicized police-related deaths; policing; crime

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1. Introduction

Recent technological developments have revolutionized the dissemination of information on newsworthy events: internet-based media reporting and social network sharing can result in news spreading instantaneously and extensively. In the U.S., controversial police-related deaths of blacks who were killed by the police or died in police custody have frequently become widely publicized due in large part to the viral dissemination of information. For example, the deaths of Eric Garner (New York City, July 2014), Michael Brown (Ferguson, Missouri, August 2014), and Freddie Gray (Baltimore, Maryland, April 2015) soon made national news headlines and drew international attention (Desmond, Papachristos, and Kirk 2016). These high-profile incidents, often sparking widespread public outrage and drawing extensive scrutiny of the police, can have potentially far-reaching effects. The widespread speculation is that these incidents lead police officers to pull back from law enforcement activities and in turn contribute to an alarming spike in violent crime – homicide in particular – in many large U.S. cities (Lichtblau 2016, Rosenfeld 2016). According to former Federal Bureau of Investigation (FBI) Director James Comey, there is "a chill wind blowing through American law enforcement" in the wake of recent highly publicized police-related deaths, and "that wind is surely changing behavior" (Comey 2015). However, to date there has been little causal evidence of whether high-profile police-related deaths affect policing and crime.

In this paper, we examine the effects of 15 highly publicized police-related deaths of black civilians, which began in 2014Q3, on policing and crime. Potentially, the largest behavioral responses to these deaths could be in black-concentrated geographic areas. Our main analysis of 71 large U.S. cities adopts a difference-in-differences (DD) strategy, comparing changes in arrest and crime rates in the 18 cities with the highest black population shares (high $\%Black$ cities)

before and after 2014Q3 versus other cities with relatively low black population shares (low $\%Black$ cities). This identification strategy relies on the assumption that the outcome changes in high and low $\%Black$ cities should have been the same in the absence of the high-profile incidents. We find that before 2014Q3 outcomes did not diverge and that changes in observable outcome determinants were similar between high and low $\%Black$ cities, lending support to the identifying assumption.

Our estimates suggest that the highly publicized police-related deaths led to a 23.4 percent reduction in arrests and a short-lived 19.8 percent increase in homicides in high $\%Black$ cities between 2014Q3 and 2016Q4. By comparison, we find no meaningful impact on other major index crime categories (robbery, aggravated assault, burglary, larceny, and motor vehicle theft). These results have two implications. First, they suggest the existence of de-policing: police officers withdrawing from policing activities in response to the high-profile police-related deaths. Second, they imply that these high-profile incidents caused a substantial social cost arising from the increased homicides, which we estimate to be approximately $1.2 billion each quarter in high $\%Black$ cities.

To supplement our main analysis, we provide a within-city analysis of St. Louis, exploiting the city's high degree of black-white residential segregation. Here we adopt a similar DD strategy to compare changes in policing and crime outcomes between St. Louis's predominantly black and white Census tracts. The results are consistent with our main analysis: the high-profile police-related deaths led to fewer arrests (19 percent) and caused a short-lived increase in homicides (18.8 percent) in predominantly black tracts. Most importantly, we find direct evidence of de-policing, by showing that police officers reduced self-initiated activities (13.1 percent) in response to the high-profile deaths.

The main contribution of this study is to inform the vigorous national debate on the highly publicized police-related deaths by providing the first credible evidence of its impact.[1] Our results validate the growing concerns that these high-profile incidents caused de-policing and increases in crime. Our work also complements an extensive literature on policing behavior (Anwar and Fang 2006, Donohue III and Levitt 2001, Mas 2006) by providing a particularly detailed analysis of the effects on arrest and self-initiated activity. Specifically, our research joins a small but growing literature on how high-profile random shocks, such as excessive use of police force, scandals, and budget cuts, affect policing in general (DeAngelo and Hansen 2014, Heaton 2010, Shi 2009). Finally, our findings contribute to the broad literature on the economics of crime (Becker 1968) by documenting how police officers, criminals, and citizens could respond to perceived changes in incentives.

2. Background

2.1. Highly Publicized Police-Related Deaths during 2014-2016

Beginning in 2014Q3, high-profile incidents in which African-Americans were killed by the police or died in police custody have captured nationwide attention in the United States. Based on a recent New York Times article (Lee and Park 2018), we identify 15 such cases during our

[1] Several recent criminology studies focus on examining the effects of the shooting of Michael Brown in Ferguson. Some researchers adopt a cross-sectional design and compare outcomes only in the post-shooting period, which does not account for pre-existing differences. For example, Shjarback, Pyrooz, Wolfe, and Decker (2017) use this method and study the Ferguson shooting's effect on year-to-year changes in traffic stops from 2014 to 2015 in Missouri. They find fewer traffic stops, searches, and arrests, but no appreciable effect on violent or property crime rates, in areas with larger African-American populations after the shooting. Others use time-series methodologies to estimate the effects, but without adequately addressing the effect of the general time trend driven by other (unobservable) factors. For example, Rosenfeld (2016) compares St. Louis's crime trends in 2014 and in 2013 and conclude that the Ferguson shooting did not appear to increase homicides or violent crimes but could have a large positive effect on property crimes. Morgan and Pally (2016) use interrupted time-series models and document a 19 percent decrease in arrests and mixed crime effects in Baltimore within eight months after the Ferguson shooting. Pyrooz, Decker, Wolfe, and Shjarback (2016) adopt a discontinuous growth model and find that the Ferguson shooting had no significant effect on crime (except for robbery) in 81 large U.S. cities.

treatment period (2014Q3-2016Q4). Table 1 provides information on each incident based on Lee and Park (2018), Park and Lee (2017), and data we assembled from other news sources. The first three columns report the victim's name, date of death, and city of incident. Column 4 summarizes the cause of death, showing that the vast majority of those deaths among blacks (12) were caused by police gunshot. Column 5 shows that all but one incident was caught on video, partly explaining why these incidents became highly publicized. The data in Column 6 indicate that the Department of Justice (DOJ) investigated more than half (8) of the incidents. Columns 7 through 9 reveal that these high-profile police related deaths could substantially raise the expected cost facing police officers: officers involved in all incidents (100 percent) were placed on leave or reassigned; officers in five incidents (33 percent) were fired; and officers in 8 incidents (53 percent) were indicted or charged. Column 10 further shows that, among the officers who were indicted or charged, three were convicted. We briefly describe the timeline of the 15 highly publicized police-related deaths below.

Eric Garner. On July 17, 2014, Eric Garner, a 43-year-old man, died in New York City after a white police officer (Daniel Pantaleo) placed him in a chokehold during an arrest for selling untaxed cigarettes (Goldstein and Schweber 2014). On December 3, a Staten Island grand jury declined to indict Officer Pantaleo in Garner's death, determining that there was no probable cause that a crime was committed (Eversley and James 2014). On July 13, 2015, New York City reached a settlement with the family of Eric Garner, agreeing to pay $5.9 million to resolve a wrongful-death claim over his killing (Goodman 2015).

Michael Brown. On August 8, 2014, Michael Brown, an unarmed black teenager, was shot and killed by a white police officer (Darren Wilson) in Ferguson, Missouri, after being accused of robbing a convenience store (Brown 2014). The shooting led to emotionally-charged and, in many

cases, violent protests, prompting Missouri Governor Jay Nixon to declare a state of emergency and impose a curfew in Ferguson (Alcindor 2014). On August 18, President Obama dispatched Attorney General Eric Holder to Ferguson to monitor the situation (Kaplan 2014). On November 24, a Ferguson grand jury decided not to indict officer Wilson for any crimes related to the death of Brown, setting off another round of nationwide protests (Basu, Yan, and Ford 2014). On March 4, 2015, the Justice Department cleared Wilson of civil rights violations in the shooting, but concluded that the Ferguson Police Department had been routinely violating the constitutional rights of its black residents (Eckholm and Apuzzo 2015).

Laquan McDonald. On October 20, 2014, Jason Van Dyke, a white police officer, shot and killed 17-year-old Laquan McDonald in Chicago, Illinois, after the teenager refused to put down a knife (Ford 2014). On April 15, 2015, the City Council agreed to pay a $5 million settlement to McDonald's family (Davey 2015a). On November 24, the Chicago Police Department released a dash camera video showing that McDonald was shot 16 times, after freelance journalists sued for the release and one day before the court-ordered deadline (Sanburn 2015). Van Dyke was charged with a first-degree murder hours before the video's release and was released from jail on $1.5 million bail on November 30 (Davey 2015b).

Akai Gurley. On November 20, 2014, Peter Liang, a Chinese-American rookie police officer, shot and killed unarmed Akai Gurley, while patrolling a dark housing project stairwell in New York City (Shallwani 2014). On February 11, 2016, Liang was convicted of manslaughter and official misconduct by a Kings county jury; he was later fired by the New York Police Department after the ruling (Lartey 2016). On April 19, a Brooklyn Supreme Court judge reduced Liang's manslaughter jury verdict to less severe criminally negligent homicide, saying that there

was no evidence that Liang was even aware of Gurley's presence in the stairwell; Liang was sentenced to five years of probation and 800 hours of community service (Feuer 2016).

Tamir Rice. On November 22, 2014, Timothy Loehmann, a white officer-in-training, shot and killed 12-year-old Tamir Rice outside a recreation center in Cleveland, when Rice reached for a weapon that turned out to be a fake pistol (Fitzsimmons 2014, Trexler 2015). On December 28, 2015, an Ohio grand jury decided not to indict Officer Loehmann; the prosecutor said that "the evidence did not indicate criminal conduct by police" (Fantz, Almasy, and Shoichet 2015). On April 25, 2016, the city of Cleveland has agreed to pay Rice's family $6 million to settle a federal lawsuit filed over the shooting of Rice (Heisig 2016).

Walter Scott. On April 4, 2015, Michael Slager, a white police officer in North Charleston, South Carolina, shot and killed 50-year-old Walter Scott after Scott fled a traffic stop. On April 7, Slager was charged with murder, after a bystander video showed that Slager shot Scott in the back as the unarmed black man ran away (Schmidt and Apuzzo 2015). On October 8, the city of North Charleston reached a $6.5 million settlement with the family of Walter Scott (Lowery 2015). On May 2, 2017, Slager pleaded guilty in court, admitting that he did not shoot Scott in self-defense and said that his use of force was unreasonable (Yan, Shah, and Grinberg 2017). On December 17, Slager was sentenced to 20 years in prison, after the judge in the case said that he viewed the shooting as a murder (Blinder 2017).

Freddie Gray. On April 12, 2015, Freddie Gray, a 25-year-old black man, was arrested in Baltimore, Maryland, after police officers on bike patrol saw him walking with two friends; the police said that Gray made eye contact and started running (Woods and Pankhania 2016). Gray was taken to a district police station by a transportation van; during the 45-minute ride, Gray sustained a severe and ultimately fatal spinal cord injury (Rector 2015). On April 19, Gray died

after being in a coma for one week and after two surgeries attempting to save him failed (Woods and Pankhania 2016). On May 1, six officers involved in the arrest and transport of Gray – three whites and three blacks –were charged with felonies ranging from assault to murder (Peralta 2015). On September 8, Baltimore officials reached a $6.4 million settlement with the Gray's family (Alexander 2015). Up to July 27, 2016, all charges against the six officers had been dropped (Stolberg and Bidgood 2016). On September 12, 2017, the DOJ concluded that the six officers would not face federal civil rights charges (Schuppe 2017).

Sandra Bland. On July 10, 2015, 28-year-old Sandra Bland was stopped by Brian Encinia, a white Department of Public Safety (DPS) trooper, in Prairie View, Texas, after allegedly failing to use turn signal while changing lanes (Lai, Park, Buchanan, and Andrews 2015). This traffic stop escalated into a physical altercation, ultimately leading to Bland's arrest, as shown by a released dash cam video (Montgomery 2015). Three days later (July 13), Bland was found hanging inside a cell at the Waller County Jail; an autopsy classified her death as suicide by hanging (Lai et al. 2015). On December 21, a Texas grand jury declined to indict anyone in connection to Bland's death (Smith 2015).[2] On September 16, 2016, Bland's family reached a $1.9 million settlement in a wrongful-death lawsuit with Waller County and the Texas DPS (Kennedy 2016).

Samuel DuBose. On July 19, 2015, 43-year-old Samuel DuBose was fatally shot by Ray Tensing, a white University of Cincinnati police officer, in Cincinnati, Ohio, after he was pulled over by Tensing for having a missing front license plate (Johnson 2015). On July 29, Tensing was fired by the university and indicted with murder and voluntary manslaughter by a grand jury, after his body-camera footage contradicted his account that he was dragged by DuBose's vehicle

[2] On January 6, 2016, Encinia was indicted with perjury by a grand jury, which was related to his reasoning that removed Bland from her vehicle (Friedman 2016). In June, Encinia turned in his law enforcement license in exchange for having the perjury charge dismissed (Almasy and Lynch 2017).

(Meyer 2015). On January 18, 2016, University of Cincinnati settled with DuBose's family for $4.85 million plus free tuition for his 12 children valued at an additional $500,000 (Stolberg 2016).

Christian Taylor. On August 7, 2015, a white rookie police officer, Brad Miller, shot and killed 19-year-old Christian Taylor, a college football player at Angelo State University, at a car dealership in Arlington, Texas, while responding to a burglary report (Helsel 2015). Miller was fired for "inappropriate judgment" in his handling of the situation on August 11 (McGee and Fernandez 2015). On June 8, 2016, a Tarrant County grand jury decided not to indict Miller (Steele 2016). On May 23, 2017, the city of Arlington paid $850,000 to settle a wrongful death lawsuit filed by Taylor's family (Cadwallader 2017).

Alton Sterling. On July 5, 2016, 37-year-old Alton Sterling was shot and killed by two white police officers (Blane Salamoni and Howie Lake II) in Baton Rouge, Louisiana, after the officers responded to a complaint about an armed man threatening people outside a convenience store (Lowery, Andrews, and Miller 2016). Graphic videos of the incident taken by bystanders, which show that the officers pinned Sterling to the ground, spread quickly on social media and prompted nationwide protests (Berman and Lowery 2018, Fausset, Pérez-Peña, and Robertson 2016). The Department of Justice opened a civil rights investigation into the shooting; federal prosecutors announced in May, 2017 that there was not enough evidence to warrant civil rights charges against the two officers (Almasy, Yan, Lynch, and Levenson 2017).

Philando Castile. On July 6, 2016, Philando Castile, a 32-year-old black man, was shot and killed by a St. Anthony police officer (Jeronimo Yanez) during a traffic stop in Falcon Heights, Minnesota (Domonoske and Chappell 2016).[3] Diamond Reynolds, Castile's girlfriend, live-streamed the aftermath of the fatal shooting on Facebook Live, which spurred national attention to

[3] According to a National Public Radio (NPR) analysis of public records (Peralta and Corley 2016), Castile was stopped by police at least 46 times and fined more than $6,000 between July 2012 and July 2016.

Castle's death (Stelter 2016). On June 16, 2017, a St. Paul jury acquitted Yanez of charges in shooting, including second-degree manslaughter and endangering safety by discharging a firearm in the shooting (Smith 2017). On June 26, Castile's family reached a nearly $3 million settlement with the city of St. Anthony (Orjoux 2017).

Paul O'Neal. On July 28, 2016, 18-year-old Paul O'Neal was fatally shot by police officers in Chicago during a stolen car investigation (Bentle 2016). Within the next few days, the Cook County Medical Examiner's Office ruled O'Neal's death a homicide and the three officers involved in the shooting were relieved of duty (Green 2016).

Terence Crutcher. On September 16, 2017, 40-year-old unarmed Terence Crutcher was fatally shot by a white police officer, Betty Shelby, in Tulsa, Oklahoma, after Crutcher's car was found abandoned blocking a road (Morris and Blau 2016). On September 22, Shelby was charged with first-degree manslaughter (Fernandez 2016). On May 17, 2017, an Oklahoma jury acquitted Shelby (Hogan 2017).

Keith Lamont Scott. On September 20, 2016, 43-year-old Keith Lamont Scott confronted police officers who served a warrant on someone else in the parking lot of his apartment complex in Charlotte, North Carolina; the officers attempted to arrest Scott due to his possessions of an illegal drug (a marijuana cigarette) and a gun (Larimer 2016). According to a case update released by the police (Maxwell and Alexander 2016), Scott exited his vehicle and continued to ignore officers' repeated loud verbal commands to drop the gun. Brentley Vinson, a black officer, fatally shot Scott, whose actions he perceived as threatening (Chokshi 2016). Vinson was placed on administrative leave after the shooting; in November, the prosecutor in Mecklenburg County decided not to charge him, saying that Vinson's use of deadly force was justified because he

reasonably believed he or another person was in imminent danger of great bodily injury or death (Fausset and Blinder 2016).

In Figure 1, we plot the timeline of these 15 high-profile deaths. These incidents occurred in five quarters during 2014-2016: 2014Q3, 2014Q4, 2015Q2, 2015Q3, and 2016Q3. For the convenience of discussion, we refer to them as "high-profile quarters." Similarly, we define the other five quarters (2015Q1, 2015Q4, 2016Q1, 2016Q2, and 2016Q4) in the treatment period as "low-profile quarters." There were at least two high-profile deaths in each of the high-profile quarters, with the most (five) in 2016Q3. To gauge how these incidents attracted public attention, we tally the Google searches of the 15 victims' names, using data obtained from Google Trends (https://trends.google.com). Although Google Trends does not provide the absolute number of search counts for searched terms, it does create search index values for them, making relative comparisons possible.[4] We construct nationwide search index values for each victim's name between 2012 and 2016. The index data suggest that five incidents – the deaths of Eric Garner, Michael Brown, Freddie Gray, Sandra Bland, and Alton Sterling – received the most attention, by generating considerably more searches than others. We include in Figure 1 the quarterly index values for these five most searched names, which suggest that the attention generated by the five most high-profile deaths typically lasted at most one quarter. The extensive attention toward the deaths of Eric Garner and Michael Brown continued into and peaked in the next quarter following the killings (2014Q4), when the highly publicized grand jury decisions not to indict the involved officers sparked a new round of nationwide protests.

[4] Google Trends creates a search index for terms searched through Google in two steps. First, it divides the total searches of each term by the overall searches conducted for each time and place. Next, it scales the resulting search rates on a range of 0 to 100: assigning the value of 100 to the maximum search rate and dividing other search rates by the maximum search rate. Although the Google Trends index constructed this way is strictly ordinal, it allows for comparing terms' relative popularity; recent studies have used Google Trends data to measure changes in interest induced by social events, such as elections (Stephens-Davidowitz 2014) and social media (Kearney and Levine 2015).

2.2. Conceptual Framework

How might recent highly publicized police-related deaths affect policing and crime? Specifically, how could these incidents broadly change the behaviors of police officers, criminals, and citizens?

First, we consider two opposing channels through which policing behaviors could be affected. On the one hand, the high-profile police-related deaths significantly increased police officers' expected cost of confronting black suspects. Not only did these incidents lead to enormous public outrage toward and criticism of the police, they also resulted in probations, firings, indictments, and charges of the involved officers. As police officers increasingly fear that their confrontations with blacks, legally justified or not, could easily be negatively stereotyped and turn into the next high-profile and controversial incidents, one would expect them to withdraw from law enforcement activities and avoid such confrontations. We label this response as the "de-policing effect." On the other hand, it is possible that these incidents also created a "monitoring effect," with the ensuing public scrutiny of police practices preventing officers from shirking and potentially incentivizing them to improve performance. Taken together, the net effect on policing depends on which of the two effects would dominate.

Next, we discuss how the highly publicized police-related deaths could potentially affect crime in two major ways. These incidents obviously could affect crime through the straightforward and well-documented channel of policing: more policing activities reduce crimes through incapacitation (e.g., arresting criminals) (Berthelon and Kruger 2011, Jacob and Lefgren 2003, Levitt 1996) and deterrence (e.g., increasing police presence) (Di Tella and Schargrodsky 2004, Draca, Machin, and Witt 2011, Klick and Tabarrok 2005). Specifically, the monitoring

effect would lead to fewer crimes by arresting and deterring criminals, and the de-policing effect would have the opposite effect by emboldening criminals. However, the controversial police-related deaths could also affect crime through the channel of trust. They might directly damage community trust in the police and result in more crimes (Donohue 2017, Rosenfeld 2016). For example, if the exacerbated trust made citizens less cooperative with the police in crime reporting and investigations, then it would lower the expected cost of committing crimes, resulting in more criminal activities. Along similar lines, any reduction in trust would lead citizens to resolve interpersonal disputes or criminal activities by themselves, rather than resorting to the police, potentially escalating otherwise non-violent situations into violent crimes.[5] On the other hand, if police officers indeed pulled back from policing in response to the high-profile police-related deaths, then this de-policing potentially could help to strengthen the community-police relationship and therefore reduce crimes. For example, in communities of color, where policing is generally thought to be unnecessarily excessive and aggressive (Davis 2017, Smith and Holmes 2014), de-policing could generate benefits, if police officers retreat from proactive policing (e.g., conduct fewer pedestrian checks) or police less aggressively (e.g., use less force). As a result, de-policing has the potential to indirectly restore the damaged trust in the police, lead to more community-police cooperation, and ultimately prevent crimes.

One critical feature of the 15 high-profile police-related deaths considered in this study is the issue of race: all the victims were black civilians. These incidents exacerbated racial tensions and sparked the Black Lives Matter (BLM) movement (Day 2015, Luibrand 2015); thus, one would expect them to have had the largest impact in black communities. Anger toward the police

[5] When people "do not trust the police to act on their behalf and to treat them fairly and with respect, they lose confidence in the formal apparatus of social control and become more likely to take matters into their own hands" informally and often violently (Rosenfeld 2016).

would be a likely outcome. The widely believed phenomenon of over-policing (Brunson 2007, Brunson and Miller 2006, Weitzer 2000) and the deep-rooted disbelief in the criminal justice system (Desmond et al. 2016, Kirk and Papachristos 2011) could further compound the effect. Along with the high probability of confronting blacks, these responses would lead police officers in black communities to change their behaviors more than would their counterparts in white communities. Accordingly, criminals' behaviors would be affected the most in black communities.

Taken together, this conceptual framework suggests that recent high-profile police-related deaths could have an impact on policing and crime, although the net effect is ambiguous *ex ante*. Moreover, we expect the effect to be largest in black-concentrated areas, where these incidents could lead to the largest behavioral responses.

3. Multi-City Analysis

We present a multi-city analysis of 71 large U.S. cities using data from 2012 to 2016. We choose arrest as our measure of policing behavior in this analysis for two reasons. First, arrest is one of the most important and routine policing practices. Second, to the best of our knowledge, arrest is the only major policing measure for which there are available city-level panel data for U.S. cities, collected by the FBI's Uniform Crime Reporting (UCR) program and well-suited for this analysis. For crime outcomes, we look at violent crimes (homicide, robbery, and aggravated assault) and property crimes (burglary, larceny, and motor vehicle theft), the FBI's major index crime categories, widely used to measure the level and scope of crime.

3.1. Empirical Strategy and Data

To identify causal effects, we adopt a difference-in-differences (DD) strategy, distinguishing the effects of the high-profile police-related deaths from the effects of other confounders. Specifically, we examine changes in arrest and crime rates in cities with the highest black population shares (high $\%Black$ cities, the treatment group) before and after 2014Q3, relative to changes in cities with relatively low black population shares (low $\%Black$ cities, the control group). In doing so, we exploit the implication that the high-profile police-related deaths potentially had the largest effects in high $\%Black$ cities, according to our conceptual framework. The corresponding identifying assumption requires that outcomes in treatment and control cities should have trended similarly in the absence of these high-profile incidents. Formally, we estimate the following city-level panel model with quarterly data:

$$(1)\ Outcome_{cyq} = \beta_0 + \beta_1 Post2014Q3_{yq} \times High\%Black_c + \mathbf{X}_{cy}\boldsymbol{\gamma} + City_c + Quarter_{yq} + \varepsilon_{cyq}.$$

$Outcome_{cyq}$ is the logarithm of arrest or crime rate in city c in quarter q of year y. $Post2014Q3_{yq}$ equals 1 during and after 2014Q3 and equals 0 otherwise. $High\%Black_c$ is an indicator variable that equals 1 for high $\%Black$ cities, where the pre-2014 non-Hispanic black population share ($\%Black$) is above 28.2%, the 75th percentile for the 71 large cities. $\mathbf{X}_{cy}$ is a vector of time-varying covariates for city c in year y, including demographic and socioeconomic controls. The city fixed effects $City_c$ accounts for time-invariant city-specific outcome determinants, capturing the permanent differences between high and low $\%Black$ cities. $Quarter_{yq}$ is the year-by-quarter fixed effects and controls for time-series changes in arrest and crime rates that were common to all cities. We cluster standard errors at the city level to account for potential within-city serial error correlation (Bertrand, Duflo, and Mullainathan 2004). With

this specification, β_1 is the parameter of interest and measures the average effect of highly publicized police use-of-force incidents between 2014Q3 and 2016Q4.

We estimate Equation (2) in order to distinguish between the effects in the high-profile quarters and low-profile quarters:

$$(2)\ Outcome_{cyq} = \alpha_0 + \alpha_1 Post2014Q3_{yq} \times High\%Black_c \times HighProfileQuarter_{yq} + \alpha_2 Post2014Q3_{yq} \times High\%Black_c \times LowProfileQuarter_{yq} + \mathbf{X}_{cy}\boldsymbol{\gamma} + City_c + Quarter_{yq} + \varepsilon_{cyq}.$$

$HighProfileQuarter_{yq}$ is an indicator for the five high-profile quarters, during which the highly publicized police-related deaths occurred, and $LowProfileQuarter_{yq}$ is an indicator for the five low-profile quarters. α_1 and α_2 hence measure the effects in the high-profile and low-profile quarters, respectively.

To select the large U.S. cities for our analysis, we began with 77 cities and towns that were classified as "Group I" cities – cities with population exceeding 250,000 – as defined by the FBI in each year during 2012-2016. We excluded from the sample six cities that had data availability issues with both arrest and crime data: two in New York with no data (Brookhaven and Islip), three in Florida with no quarterly-level data (Jacksonville, Miami, and Tampa), and one in North Carolina (Raleigh) with no data after 2014Q3. This left us with a sample of 71 cities, including 18 treatment cities and 53 control cities, as shown in Table 2. There we also report each city's pre-2014 black population share. Figure 2 shows the geographic distribution of these 71 cities, along with the locations of the high-profile police-related deaths.

Our empirical approach requires measuring quarterly arrest rate (number of arrestees per 1,000 city population) and crime rate (number of crimes per 1,000 city population) for the selected cities. To do this, we obtain monthly UCR data on arrest and crime from the Inter-university

Consortium for Political and Social Research (ICPSR); we then aggregate these data at the quarterly level. Out of the 1420 (71 cities $\times$ 5 years $\times$ 4 quarters) city-year-quarter cells, there are a few missing values for crime outcomes.[6] For example, homicide has 18 (1.3 percent) missing values. By comparison, 141 (9.9 percent) of the arrest observations are missing. Six cities (Chicago, Cincinnati, District of Columbia, New Orleans, New York City, and Toledo), in particular, have either no or not reliable arrest data. The arrest data allow us to measure total arrests, the arrests of blacks and whites, as well as felony arrests (arrests related to violent and property crimes) and misdemeanor arrests (arrests related to other less severe crimes).[7][8] The crime data provide measures for six crime categories: three violent crimes (homicide, robbery, and aggravated assault) and three property crimes (burglary, larceny, and motor vehicle theft).

Further, we collect data on city-level time-varying covariates ($\mathbf{X}_{cy}$). The data on demographic and socioeconomic factors come from the ACS, including black population share, percentage of males, percentage of population aged 25-64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, and median household income (in 2015 dollars). In order to control for the effect of the size of the police force, we also obtain data from the FBI on the number of police officers (per 1,000 population). It is important to note that the main purpose of controlling for these observable covariates in our DD analysis is to test the validity of the common trend assumption. To the extent that the DD estimates are robust to the inclusion of these control variables, it would imply that changes in these

[6] We also treat a few observations that are considerably smaller from others for the same city as missing.
[7] Black arrests include arrests of blacks of both Hispanic and non-Hispanic ethnicities.
[8] Specifically, misdemeanor arrests are related to Part II crimes, as opposed to Part I crimes (violent and property crimes), as defined by the FBI. The FBI defines Part II crimes as other less severe crimes, including simple assault, forgery and counterfeiting, fraud, embezzlement, receiving stolen property, vandalism, weapons violations, prostitution, drug violations, family offenses, disorderly conduct, and kidnapping. Details can be found at: https://www2.fbi.gov/ucr/cius_04/appendices/appendix_02.html.

observable aspects are not systematically different between high and low $\%Black$ cities. While it is impossible to know whether this also holds true for unobservable factors, robustness to these controls tends to support the identifying assumption.

Column 1 in Table 3 presents the summary statistics for the full sample. Columns 2 and 3 report the summary statistics for high and low $\%Black$ cities during 2012-2013, respectively. Thus we can compare the treatment and control cities in the pre-treatment period. The data in these two columns show that arrest rates and crime rates (violent crime rates in particular) tend to be higher in high $\%Black$ cities than in low $\%Black$ cities. It is also important to note that these two types of cities differed in other aspects in 2012-2013. For example, high $\%Black$ cities tended to have higher poverty rates and unemployment rates, lower median household income, and a larger police force (per 1,000 population). While such *level* differences do not necessarily invalidate our DD strategy, they do highlight the importance of accounting for permanent differences between high and low $\%Black$ cities in identifying the causal effects.

3.2. Results

3.2.1. Policing

We begin with an event study analysis to motivate the regression results that follow. Figure 3 plots the estimated log difference in arrest rate, along with the 95 percent confidence interval, between high and low $\%Black$ cities in each quarter, controlling for the city and year-by-quarter fixed effects. All differences are relative to the difference in 2014Q2. We also use four lines to represent the average differences for the pre-treatment period (thick solid line), the post-treatment period (thick dashed line), the high-profile quarters (thin solid line), and the low-profile quarters (thin dashed line). Figure 3 reveals two important observations. First, there is no indication of

significant diverging trends in arrest rate in the pre-treatment period (2012Q1-2014Q2): all arrest rate differences are insignificant and similar in magnitude. This is consistent with the identifying assumption of our empirical strategy and implies that low $\%Black$ cities are an appropriate control group for high $\%Black$ cities. Second, during the treatment period (2014Q3-2016Q4), high $\%Black$ cities experienced a persistent relative drop in arrest rate, as evidenced by the negative and generally significant estimates. Taken together, the graphical evidence suggests that the highly publicized police-related deaths led to fewer arrests.

Table 4 presents the corresponding DD estimates: Panel 1 reports the average effect estimates based on Equation (1), and Panel 2 presents the differential effect results based on Equation (2). Column 1 is the most parsimonious DD specification; it includes only city fixed effects and year-by-quarter fixed effects. The negative and highly significant estimate (-0.240) confirms the negative effect on arrest seen in Figure 3. This estimate indicates that, on average, arrest rate in high $\%Black$ cities fell by 24 percent during 2014Q3-2016Q4, relative to low $\%Black$ cities.

In our preferred specification in Column 2, we include city-level time-varying controls. The estimate in Panel 1, indicating a 23.4 percent decrease in arrests, is very similar to the uncontrolled estimate in Column 1, both in magnitude and statistical significance. This robustness suggests that high $\%Black$ cities and low $\%Black$ cities experienced similar changes in observable dimensions, further validating the identifying assumption. The estimates in Panel 2 indicate that officers reduced arrests by at least 20 percent in both high-profile and low-profile quarters, consistent with the pattern of persistent arrest reductions seen in Figure 3.

In the last four columns, we explore the heterogeneous effects by arrestee race and offense severity. Because the high-profile police-related deaths significantly increased the expected cost

of confronting black suspects, one would expect a larger drop in black arrests than in white arrests. This is exactly what we find: Columns 3 and 4 report a 25.9 percent reduction in black arrests and a 17.6 reduction in white arrests. Next, we distinguish between felony arrest and misdemeanor arrest. The estimates in Column 5 and 6 show a larger effect on misdemeanor arrest (27.5 percent) than on felony arrest (10 percent). This is likely due to the fact that misdemeanor arrests, which could be less scrutinized than felony arrests, are subject to a smaller monitoring effect.

Overall, our results indicate that police officers made fewer arrests following the highly publicized police-related deaths, consistent with the notion that doing so would lower their risk of getting involved in controversial confrontations.

3.2.2. Crime

First we report the results on homicide. The preferred estimate in Column 2 (Panel 1) in Table 5 and the event study graph in Figure 4 indicate that the controversial police-related deaths led to a 13.4 percent increase in homicides in high $\%Black$ cities compared to low $\%Black$ cities. The estimates in Panel 2 suggest that that homicide increase was short-lived. Specifically, we estimate a 19.8 percent increase in homicides (significant at the 1 percent level) in the high-profile quarters and find much smaller (6.8 percent) and statistically insignificant homicide increases in the low-profile quarters. Among the five high-profile quarters, 2015Q3 and 2016Q3 experienced the two largest increases in homicides, according to Figure 4.

In Columns 3 and 4, we explore the differential effects on homicide by victim's race, using data from the FBI's Supplementary Homicide Report (SHR). The estimates in Panel 2 provide consistent evidence that the high-profile police-related deaths led to large increases in both black and white homicides (17.9 percent and 14.1 percent, respectively) in the high-profile quarters.

During the low-profile quarters, the effect on black homicide became smaller and less statistically significant, while the effect on white homicide seemed to disappear.[9]

In Table 6, we turn to other violent crimes and property crimes. The preferred estimates in Panel 1 suggest small and insignificant average effects on robberies (0.7 percent), aggravated assaults (3 percent), burglaries (-0.2 percent), larcenies (-0.6 percent), and motor vehicle thefts (-0.9 percent), consistent with the graphical evidence in Figure 5. The estimates in Panel 2 show that these crimes increased by 4-6 percent in the high-profile quarters; however, only two effects are precisely estimated (aggravated assault and larceny). For the low-profile quarters, we generally find no statistically significant changes in crime. The only exception is larceny: we estimate a 5.5 percent decrease that is marginally significant.

Our estimates indicate that the main crime effect of the highly publicized police-related deaths is the short-lived relative increase in homicides in high $\%Black$ cities. To assess the welfare implication of this, we provide a back-of-the-envelope calculation. First, we calculate that the high-profile incidents led to 121 more homicides per quarter in the 18 treatment cities with the highest black population shares during the high-profile quarters. That can be seen by the estimate in Column 2 (0.198). Then, based on the recent cost-of-crime estimate from McCollister, French, and Fang (2010) of $8,982,907 per homicide (in 2008 dollars), we estimate that the additional homicides in high $\%Black$ cities yielded a significant social cost of approximately $1.2 billion (in 2015 dollars), or $67 million per city, per quarter.

[9] The SHR data also allow us to examine the differential effects by homicide circumstance; however, the circumstances can only be identified for approximately 60 percent of the homicide cases. Among these cases, we find no significant effects on felony homicides or non-felony homicides (homicides in conjunction with other felony crimes or non-felony crimes, respectively), as shown by the estimates (Columns 1 and 2) in Table A1 in the Online Appendix. In particular, we find little evidence that the highly publicized police-related deaths escalated interpersonal arguments into homicides (Column 3). That said, when examining the effect on homicide with undetermined circumstance, we estimate a large and significant increase (26.2 percent), which suggests that this differential effect analysis is not conclusive due to the lack of complete data on homicide circumstance.

3.3. Robustness Check

Table 7 checks the sensitivity of our results for arrest and homicide. In the first two panels, we use alternative $\%Black$ thresholds to define $High\%Black$: the 70th percentile (Panel 1) and the 65th percentile (Panel 2). Our estimates remain robust and reflect large increases in arrests and homicides (in high-profile quarters). These estimates are slightly lower than our baseline estimates in Tables 4 and 5. That is not surprising, because here we move a few low $\%Black$ cities from the control group to the treatment group. Along similar lines, we adopt a continuous DD specification, by replacing $Post \times High\%Black$ with $Post \times \%Black$. This specification can exploit more variation in $\%Black$, but it also assumes that the effects are linear in $\%Black$. The estimates in Panel 3 tell a similar story: the highly publicized police-related deaths resulted in a 59.5 percent reduction in arrests and a 38.8 percent increase in homicides (in high-profile quarters) for every 10 percentage point increase in $\%Black$.

In Panels 4 and 5, we show the estimated effects using weighted least squares (WLS), with city population and $\%Black$ as the weights, respectively. These results are similar to the unweighted estimates. In Panel 6, we use arrest rate or homicide rate as the outcome, which yields the same conclusion.

In Panel 7, we redefine the treatment group as cities where blacks are most underrepresented in the police force. The highly publicized police-related deaths of black civilians could have a disproportionately large effect on those cities, potentially experiencing the highest racial tensions between the public and the police. Using data from the 2013 Law Enforcement Management and Administrative Statistics survey, we select 18 new treatment cities where the percentage of blacks in the population outweighs the percentage of blacks in the police force by at

least 11.2.[10] That new treatment group turns out to be very similar to the one used in the main analysis, yielding similar arrest and homicide estimates.[11]

Finally, we examine the spillover effects, by excluding from the sample the eight large cities – Arlington, Baltimore, Charlotte, Chicago, Cincinnati, Cleveland, New York City, and Tulsa – that experienced the highly publicized police-related deaths. The estimates in Panel 8 are almost the same as their counterparts in Tables 4 and 5, suggesting large spillover effects on arrests and homicides.

4. Within-City Analysis

To supplement our multi-city analysis, we next conduct a within-city analysis of St. Louis, one of the high $\%Black$ cities, using data available for the period 2013-2015. Focusing on St. Louis for this analysis has two main advantages. First, St. Louis's high degree of black-white residential segregation makes it an attractive setting for examining the effects of the high-profile police-related deaths in black communities. Second, and more importantly, St. Louis's rich policing data include detailed measures of police officers' self-initiated activities, allowing us to directly examine the de-policing effect.

[10]The survey was conducted by conducted by the Bureau of Justice Statistics. We obtained the data from Governing.com (http://www.governing.com/gov-data/safety-justice/police-department-officer-demographics-minority-representation.html).

[11] These 18 cities are: Aurora, Baltimore, Buffalo, Charlotte, Cincinnati, Cleveland, Columbus, Detroit, Greensboro, Indianapolis, Jersey City, Kansas City, Louisville, Memphis, Milwaukee, Nashville, Newark, and St. Louis. 13 of them are the treatment cities in the main analysis as shown in Table 2.

4.1. Empirical Strategy and Data

Figure 6 plots St. Louis's Census tracts by black population share using the ACS data; it shows that the black and white communities are concentrated in the city's northern and southern areas, respectively.[12] Exploiting this residential segregation, we adopt a DD strategy similar to the one used in the multi-city analysis. Specifically, we compare policing and crime outcomes between the predominantly black and white Census tracts before and after 2014Q3. Formally, we use Equations (2) to estimate the average effects:

$$(3)\ Outcome_{tyq} = \beta_0 + \beta_1 Post2014Q3_{yq} \times PredomBlack_t + \mathbf{X}_{ty}\boldsymbol{\gamma} + Tract_t + Quarter_{yq} + \varepsilon_{tyq}.$$

This specification is at the Census tract level, indexed by *t*. $Outcome_{tyq}$ is the logarithm of the policing or crime rate measure in tract t in quarter q of year y. $PredomBlack_t$ is an indicator variable that equals 1 if tract t is predominantly black (black population share greater than population shares of other racial groups in 2013). $\mathbf{X}_{ty}$ is a vector of tract-level time-varying covariates. $Tract_t$ is the Census tract fixed effects. Other variables are similarly defined as in Equations (1) and (2). Still, β_1 is the parameter of interest.

As in the multi-city analysis, we estimate the effects in four high-profile quarters (2014Q3, 2014Q3, 2015Q2, and 2015Q3) and in two low-profile quarters (2015Q1 and 2015Q4) using Equation (4).

[12] St. Louis is located to the southeast of Ferguson, where the high-profile Ferguson shooting occurred.

$$(4)\ Outcome_{tyq} = \alpha_0 + \alpha_1 Post2014Q3_{yq} \times PredomBlack_t \times HighProfileQuarter_{yq} +$$
$$\alpha_2 Post2014Q3_{yq} \times PredomBlack_t \times LowProfileQuarter_{yq} +$$
$$\mathbf{X}_{ty}\boldsymbol{\gamma} + Tract_c + Quarter_{yq} + \varepsilon_{tyq}.$$

Our case-level policing and UCR crime data come from the St. Louis Metropolitan Police Department (SLMPD), then aggregated at the tract-year-quarter level.[13] We focus on two policing activities: arrest, the policing measure we use in the multi-city analysis; and police self-initiated activity.[14] Notably, because the self-initiated activities are purely proactive policing practices, they allow us to directly examine the de-policing effect. When analyzing self-initiated activities by category, we focus on 11 major activities that occurred with regular frequency during our sample period. These include: building check, business interview, occupied car check, unoccupied car check, directed patrol, foot patrol, investigation, pedestrian check, problem solving, traffic violation, and truck inspection.[15] Our policing outcomes are arrest rate (number of arrestees per 1,000 tract population) and self-initiated activity rate (activities per 1,000 tract population). Our crime rate (number of crimes per 1,000 tract population) measures are similarly defined for violent crimes (homicide, robbery, and aggravated assault) and property crimes (burglary, larceny, and motor vehicle theft).

We collect tract-level time-varying data from the ACS for the same set of demographic and socioeconomic factors ($\mathbf{X}_{ty}$) as in the multi-city analysis.

Table 8 presents the summary statistics. Table A2 in the Online Appendix further shows that the pre-treatment differences between St. Louis's predominantly black and white communities are similar to those we observe between the high and low $\%Black$ cities in the multi-city analysis.

[13] We exclude a few Census tracts that have few residents.
[14] Similar to the multi-city analysis, St. Louis's policing data can measure black, white, felony, and misdemeanor arrests.
[15] Directed patrol is defined as police patrol in cars by the SLMPD.

4.2. Results

4.2.1. Policing

Graph 1 in Figure 7 and the estimates in Column 2 in Table 9 suggest that police officers in St. Louis's predominantly black tracts made 19 fewer arrests in response to the highly publicized police-related deaths during 2014-2015; this effect was persistent in both the high-profile and non-high-profile quarters. In Columns 3 and 4, the estimates show that the reduction in arrests was driven by the reduction in black arrests (17 percent), echoing our finding in the multi-city analysis. They also suggest that officers in black communities appeared to substitute away from arresting blacks toward arresting whites in the low-profile quarters. For the effects on felony and misdemeanor arrests, we estimate similar reductions (17.4 percent and 16.7 percent, respectively), as shown by the estimates in the last two columns.

Next, we examine the effect on self-initiated activity, the proactive policing measure that allows us to directly evaluate whether police officers were de-policing. Graph 2 in Figure 7 and Table 10 provide strong evidence of de-policing, particularly in the high-profile quarters. The preferred estimates in Column 2 in Table 10 indicate a 13.1 percent decrease in self-initiated activities, with that effect being driven by the reduction in the high-profile quarters (17.2 percent). The estimates in Columns 3 through 13 show large and significant reductions in building checks (43.3 percent), occupied car checks (11.2 percent), unoccupied car checks (40.1 percent), investigations (16.4 percent), pedestrian checks (38 percent), and truck inspections (45.5 percent), suggesting systematic de-policing. One natural concern is that the reduction in self-initiated activities might simply be driven by citizens actively avoiding the police rather than by officers strategically pulling back. However, the large decreases in self-initiated building checks and

unoccupied car checks – activities that do not necessarily involve interacting with citizens – indicate that this might not be the case.

St. Louis's policing data allow us to identify the same police officers anonymously, so we also can analyze the effects on arrest and self-initiated activity using an officer-level DD analysis. In doing so, we treat junior officers as the treatment group and senior officers as the control group. Compared to their senior counterparts, junior officers might perceive conducting law enforcement duties to be more risky following the high-profile police-related deaths and therefore become more likely to pull back from policing. For example, junior officers might fear that they would not receive sufficient support from the police department once getting involved in a similar controversial situation, due to their relative lack of track record (Shi 2009). To identify this effect, we compare changes in policing behaviors between junior and senior police officers before and after 2014Q3. As in our previous analyses, we estimate the following equations and cluster standard errors at the officer level:

$$(5)\ Outcome_{iyq} = \beta_0 + \beta_1 Post2014Q3_{yq} \times JuniorOfficer_i + Officer_i + Quarter_{yq} + \varepsilon_{iyq},$$

$$(6)\ Outcome_{iyq} = \alpha_0 + \alpha_1 Post2014Q3_{yq} \times JuniorOfficer_i \times HighProfileQuarter_{yq} + \alpha_2 Post2014Q3_{yq} \times JuniorOfficer_i \times LowProfileQuarter_{yq} + Officer_i + Quarter_{yq} + \varepsilon_{iyq}.$$

$JuniorOfficer_i$ is a dummy variable that equals one if the officer's service year with the SLMPD was less than or equal to ten years and zero if the service was more than ten years.[16] $Officer_i$ is the officer fixed effects that controls for officer-level time-invariant unobservables. The estimates in Table A3 show that junior officers made 8.2 percent fewer arrests and 15.7 percent fewer self-

[16] To ensure that the police officers used for this analysis had enough experience, we only consider those who had at least five years of service.

initiated inspections in response to the high-profile police-related deaths compared to senior officers. Those reductions mainly occurred in the high-profile quarters. These results are consistent with and reinforce the results from the tract-level analysis. Importantly, the officer-level reduction in self-initiated activities provides direct evidence that the highly publicized police-related deaths led officers to withdraw from proactive policing.

Finally, we evaluate the possibility that the estimated relative reductions in arrests and self-initiated activities in predominantly black tracts could be driven by a systematic reassignment of police officers within the city rather than de-policing. For example, black/white officers could be reassigned to police only predominantly black/white communities in order to avoid controversial encounters involving white officers and black citizens.[17] Another possible, though much less likely, scenario is that the city could simply respond to the highly publicized police-related deaths by allocating fewer police officers to predominantly black tracts. To assess the potential reassignment, we study individual officers' pattern of responding to 911 emergency calls, which are typically dispatched to nearby officers. If such reassignment did exist, then we would observe a clear change in the pattern of 911 responses. However, we find no supporting evidence for this.[18]

4.2.2. Crime

Graph 1 in Figure 8 and the estimate in Column 2 (Panel 1) in Table 11 indicate that the highly publicized police-related deaths during 2014-2015 led to a 15 percent increase in homicides in St. Louis's predominantly black tracts. Similar to the multi-city analysis, the effect appeared to

[17] Under the assumption that black officers are less likely than white officers to exercise racial profiling against black citizens (Antonovics and Knight 2009), such a reassignment could lead to fewer arrests and self-initiated inspections in over-policed predominantly black communities.

[18] In Figure A1 in the Online Appendix, we plot the 911 responses for eight representative officers, who responded to close to the median number of 911 calls. The eight graphs do not suggest a change in the pattern of responding to 911 calls between predominantly black and white tracts before and after 2014Q3.

exist only in the high-profile quarters, as evidenced by the estimates in Panel 2. In addition, other graphs in Figure 8 and remaining columns in Table 11 show that the high-profile police-related deaths resulted in more aggravated assaults (26.2 percent) and fewer burglaries (13.4 percent); the effects on other crime categories were small and statistically insignificant.

5. Discussion

The rising homicide rates in many large U.S. cities following the highly publicized police-related deaths, such as the shooting of Michael Brown in Ferguson, have led to the birth of the so-called "Ferguson effect" (Rosenfeld 2015, 2016).[19] Our analysis supports the Ferguson effect hypothesis by documenting large relative increases in homicides in the 18 large cities with the highest black population shares. Importantly, these homicide increases appeared short-lived, as we only find statistically significant increases in quarters when the high-profile police-related deaths occurred. During the five high-profile quarters, the average homicide rate in high $\%Black$ cities was 0.072, up 28.6 percent relative to the pre-treatment level (0.056). Thus, our homicide estimate in Table 5 (0.198) implies that the high-profile police-related deaths were responsible for the majority (70 percent) of the increase in homicides in high $\%Black$ cities.

The dominant interpretation of the Ferguson effect rests with de-policing, focusing on the policing channel in interpreting the observed increase in homicides: that is, police officers' withdrawal from law enforcement activities as a result of the high-profile police-related deaths led to more homicides (Rosenfeld 2016). This study provides supporting evidence for the de-policing phenomenon. First, our multi-city analysis shows that the high-profile police-related deaths led police officers to make fewer arrests. Meanwhile, there is little evidence that these incidents

[19] This term was coined by Sam Dotson, Chief of the SLMPD (Gold 2015), and then popularized by Heather Mac Donald from the Manhattan Institute (Lartey, Felton, and Beckett 2016).

caused large or statistically significant reductions in the FBI's six index crimes (homicide, robbery, aggravated assault, burglary, larceny, and motor vehicle), suggesting no overall reduction in crime during the post-treatment period. Together, the fact of an estimated reduction in arrests that could not be driven by fewer crimes implies that police officers exercised de-policing in response to the high-profile police-related deaths. According to the conceptual framework, this de-policing reflects that the de-policing effect outweighed the monitoring effect in terms of making arrests. Second, we find direct evidence of de-policing in the within-city analysis of St. Louis: we show that officers pull back from law enforcement activities by conducting fewer self-initiated inspections. This finding is consistent with the recent changes in police attitudes and experiences, as found in a Pew Research Center report (Morin, Parker, Stepler, and Mercer 2017) that surveys a nationally representative sample of 8,000 police officers. The Pew survey shows that, following recent high-profile fatal encounters between police officers and black citizens, 93 percent of the officers become more concerned about their safety, 76 percent are more reluctant to use force when it is appropriate, and 72 percent become less willing to stop and question people who seem suspicious.

Our results provide evidence that recent highly publicized police-related deaths led to de-policing and more homicides. But how did de-policing contribute to the increase in homicides? To shed light on this important question, we resort to our conceptual framework. First, high-profile police-related deaths also could affect crime through the trust channel, in addition to the policing channel, implying that part of the homicide increase could be due to the damaged trust in the police. However, the difficulty of measuring trust makes it empirically challenging to determine how homicides increased through the policing and trust channels, respectively. Second, while economic theory and empirical studies on policing and crime suggest that de-policing could

increase homicides, the *net* effect of de-policing on homicide might be smaller: de-policing could indirectly reduce homicides through the trust channel by restoring trust in the police, attenuating its overall effect on crime. To assess this possibility, we examine the effect on one of the most aggressive policing practices: justifiable homicide by police. The estimates in Table A4 imply that the high-profile police-related deaths reduced justifiable homicides by police by 45 percent.[20] This finding suggests that policing behaviors in general might become less aggressive in response to the high-profile incidents, which could help to rebuild the public trust in the police and in turn to reduce crimes.[21] Therefore, the results of this study are not conclusive as to how de-policing affected homicide.[22]

6. Conclusion

With today's technology capable of virally disseminating news and information, controversial police-related deaths frequently become quickly and widely publicized. These high-profile incidents often spark public outrage and draw extensive scrutiny of the police, raising concerns that they may lead police officers to withdraw from law enforcement activities and cause increases in crime. Using data from 71 large U.S. cities between 2012 and 2016, this study aims to provide rigorous causal evidence of the effects of recent highly publicized police-related deaths (2014-2016) on policing and crime.

Our findings show that the concerns are real. First, we find that the high-profile police-related deaths led police officers to make fewer arrests (23.4 percent) in cities with the high black

[20] Due to the low frequency of justifiable homicide by police, we estimate the effect using count data models – Poisson and negative binomial models.

[21] The crime reduction through this channel had the potential to counteract or even offset the increased crimes the high-profile police-related deaths might have caused elsewhere through other mechanisms.

[22] If the net effect of de-policing was small, then the direct effect of the damaged trust could dominate the effect on homicide, which could explain why we find no significant homicide changes in low-profile quarters in the presence of arrest reductions.

population shares, compared to cities with relatively low black population shares. Second, we find that these incidents caused short-lived increases in homicides (19.8 percent) in high $\%Black$ cities, while there was little impact on other violent crimes and property crimes. These results suggest that the high-profile police-related deaths resulted in de-policing and generated a significant social cost by increasing homicides.

Our supplementary within-city analysis of St. Louis provides consistent evidence. We estimate a 19 percent reduction in arrests and an 18.8 percent short-lived increase in homicides in the city's predominantly black tracts. In particular, examining the effects on proactive policing measures offers direct evidence of de-policing: the high-profile police-related deaths reduced police self-initiated activities by 13.1 percent.

This study takes a small first step toward the larger goal of understanding the overall effects of highly publicized police-related deaths. For future research, identifying *how* these incidents affect crime through various mechanisms deserves special consideration.

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Figures and Tables

Figure 1. Timeline of Highly Publicized Police-Related Deaths (2014-2016) and Google Searches of Victim Names

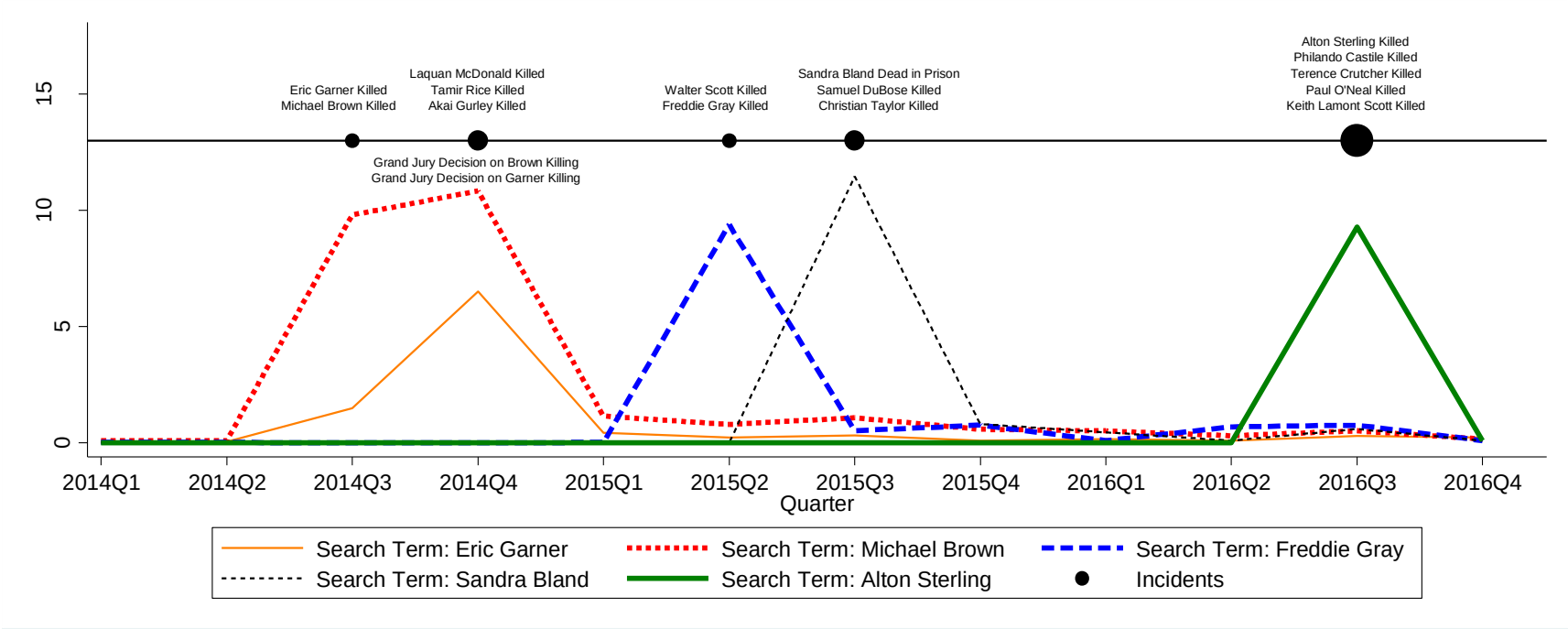
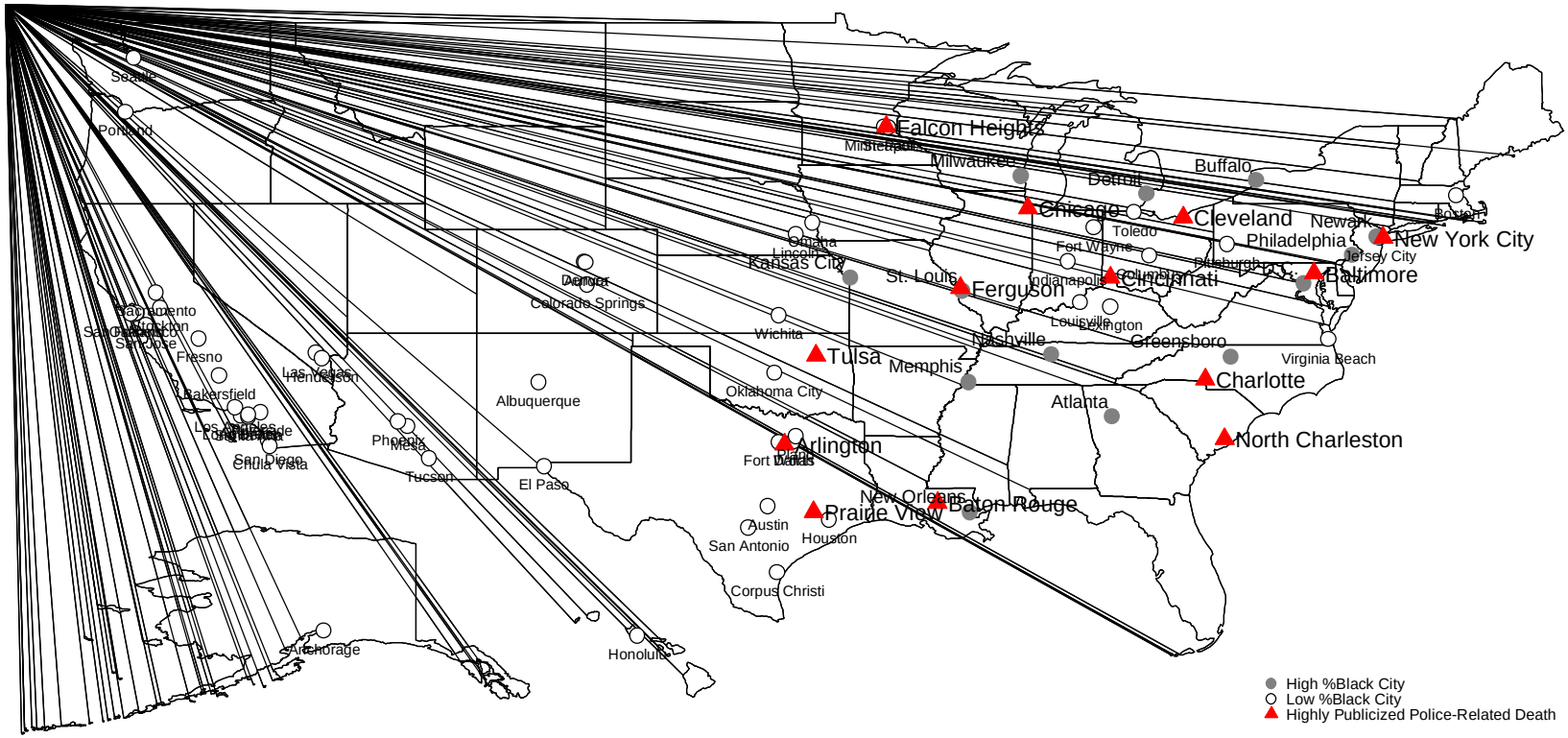
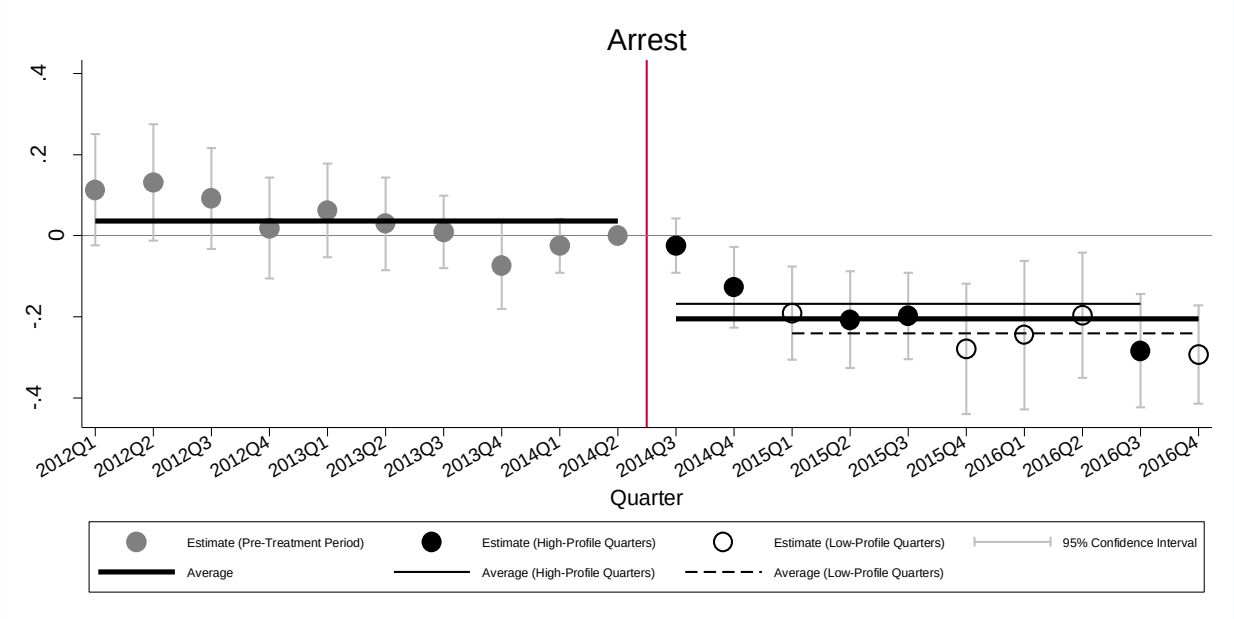


Figure 2. Map of 65 Large U.S. Cities and Cities with Highly Publicized Police-Related Deaths



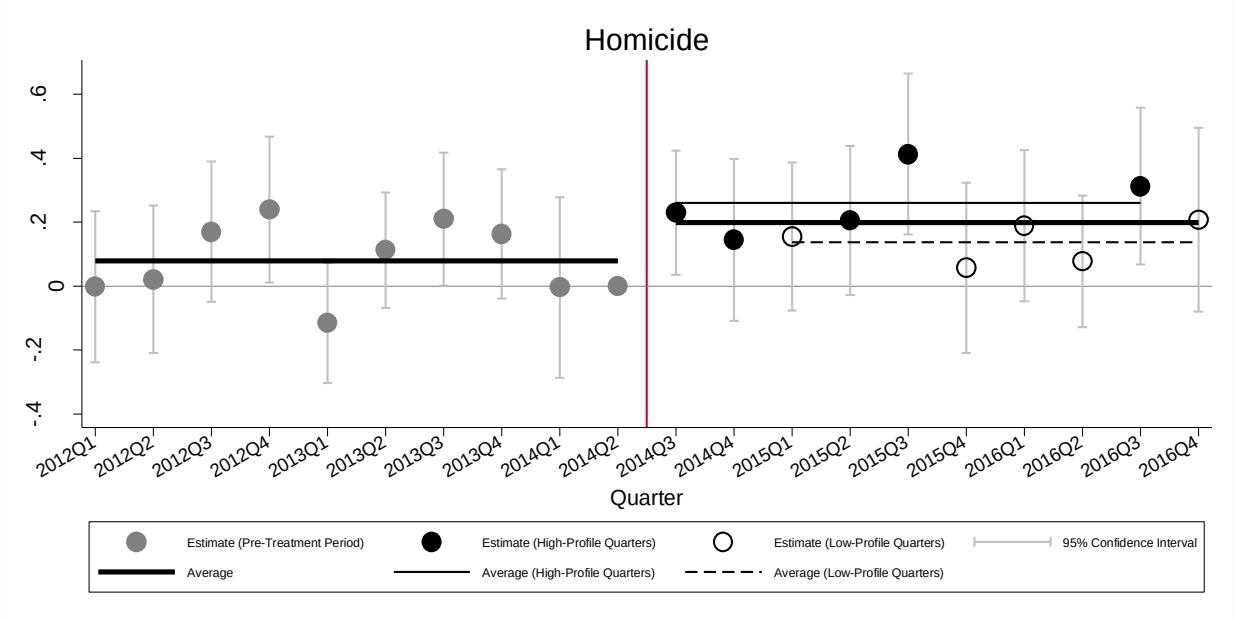
Notes: Among cities that experienced highly publicized police-related deaths, Chicago, Cleveland, Baltimore, Cincinnati, and Charlotte are High *%Black* Cities; New York City, Arlington, and Tulsa are Low *%Black* Cities.

Figure 3. Large U.S. Cities: Estimated Log Differences in Arrest Rate between High %Black Cities and Low %Black Cities before and after 2014Q3



Notes: Each estimate represents the estimated quarterly log difference in arrest rate between high *%Black* cities and low *%Black* cities, relative to the difference in 2014Q2, after accounting for city and year-by-quarter fixed effects.

Figure 4. Large U.S. Cities: Estimated Log Differences in Homicide Rate between High %Black Cities and Low %Black Cities before and after 2014Q3



Notes: Each estimate represents the estimated quarterly log difference in homicide rate between high *%Black* cities and low *%Black* cities, relative to the difference in 2014Q2, after accounting for city and year-by-quarter fixed effects.

Figure 5. Large U.S. Cities: Estimated Log Differences in Crime Rate (Other Violent Crimes and Property Crimes) between High %Black Cities and Low %Black Cities before and after 2014Q3

Notes: Each estimate represents the estimated quarterly log difference in crime rate between high *%Black* cities and low *%Black* cities, relative to the difference in 2014Q2, after accounting for city and year-by-quarter fixed effects.

Figure 6. Tract-Level Black Population Shares in St. Louis

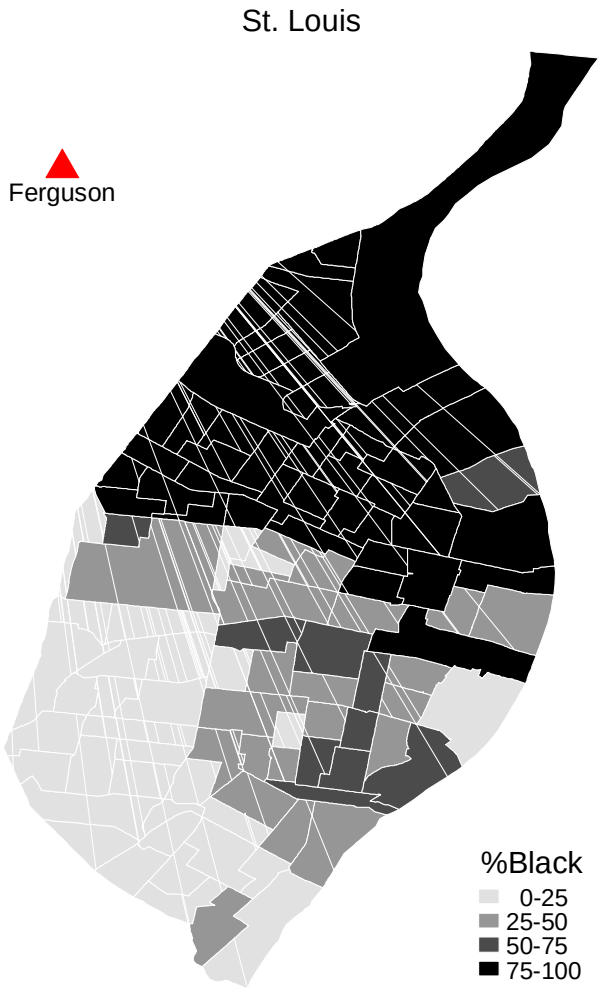
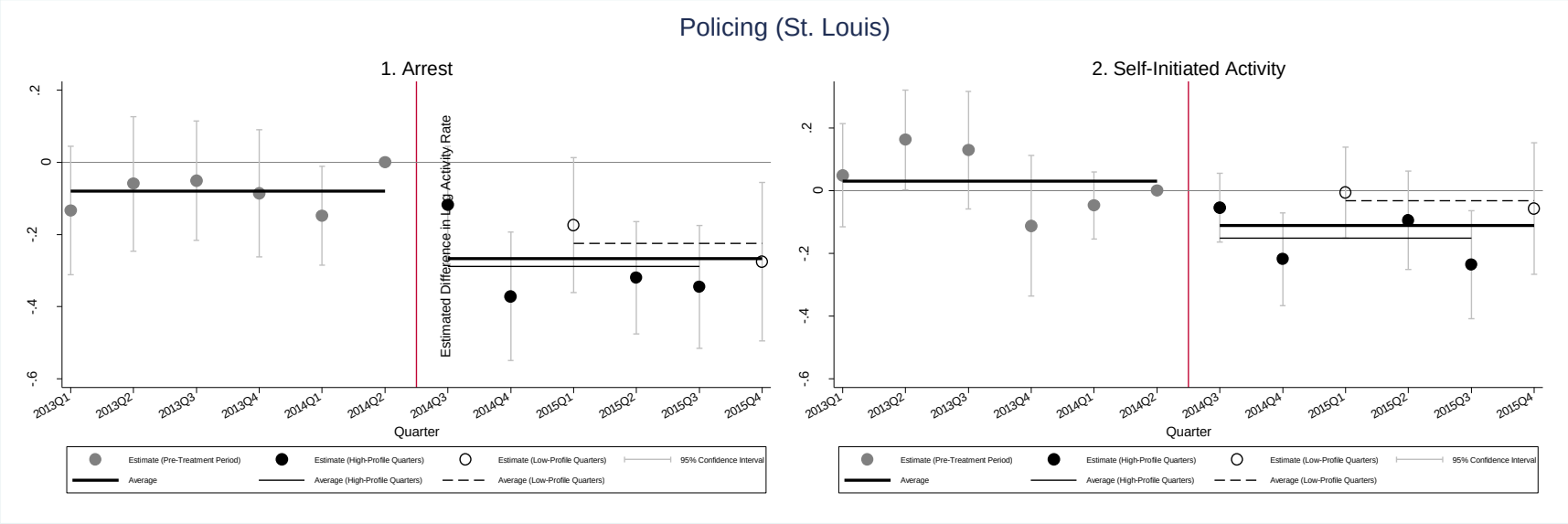
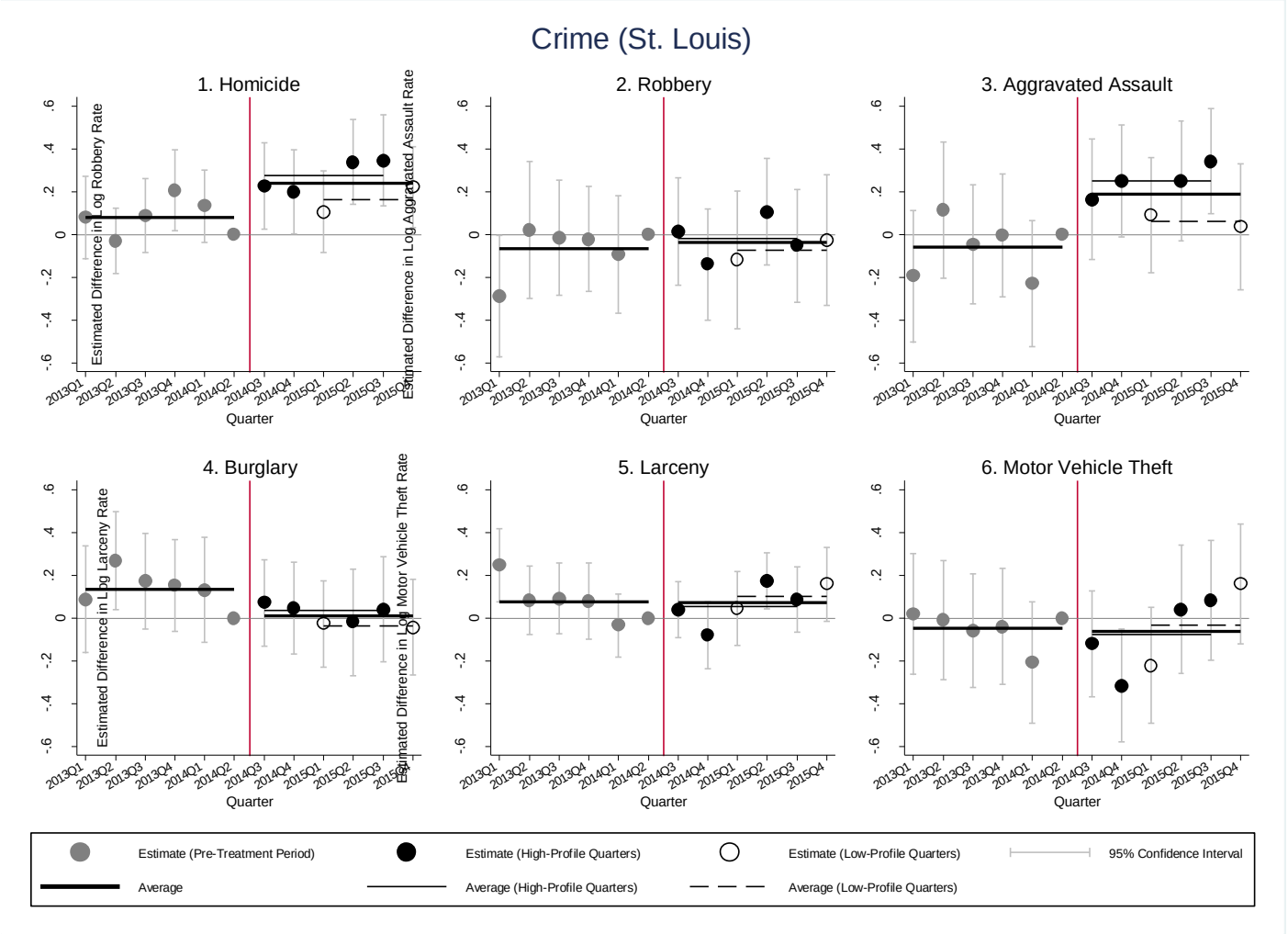


Figure 7. St. Louis: Estimated Log Differences in Arrest Rate and Self-Initiated Activity Rate between Predominantly Black and White Tracts before and after 2014Q3



Notes: Each estimate represents the estimated quarterly log difference in arrest rate or self-initiated activity rate between predominantly black and white tracts, relative to the difference in 2014Q2, after accounting for tract and year-by-quarter fixed effects.

Figure 8. St. Louis: Estimated Log Differences in Crime Rate between Predominantly Black and White Tracts before and after 2014Q3



Notes: Each estimate represents the estimated quarterly log difference in crime rate between predominantly black and white tracts, relative to the difference in 2014Q2, after accounting for tract and year-by-quarter fixed effects.

Table 1. Ten Highly Publicized Police-Related Deaths

s	Date of Death	City	Cause of Death	Caught on Video	DOJ Investigation	Involved Police Officer			
						Placed on Leave or Reassigned	Fired	Indicted or Charged	Trial
1	2	3	4	5	6	7	8	9	10
Eric Garner	07/17/2014	New York City, NY	Chokehold	Yes	Yes	Yes	No	No	-
Michael Brown	08/09/2014	Ferguson, MO	Gunshot	Yes	Yes	Yes	Resigned	No	-
Laquan McDonald	10/20/2014	Chicago, IL	Gunshot	Yes	Yes	Yes	No	Yes	Convicted (second-degree manslaughter)
Akai Gurley	11/20/2014	New York City, NY	Gunshot	No	No	Yes	Yes	Yes	Convicted (negligent homicide)
Tamir Rice	11/22/2014	Cleveland, OH	Gunshot	Yes	No	Yes	No	No	-
Walter Scott	04/04/2015	North Charleston, SC	Gunshot	Yes	Yes	Yes	Yes	Yes	Convicted (sentenced to 20 years in prison)
Freddie Gray	04/12/2015	Baltimore, MD	Spinal cord injury	Yes	Yes	Yes	No	Yes	No conviction
Sandra Bland	07/13/2015	Prairie View, TX	Suicide	Yes	No	Yes	Yes	Yes	No conviction
Samuel DuBose	07/19/2015	Cincinnati, OH	Gunshot	Yes	No	Yes	Yes	Yes	No conviction
Christian Taylor	08/07/2015	Arlington, TX	Gunshot	Yes	No	Yes	Yes	No	-
Alton Sterling	07/05/2016	Baton Rouge, LA	Gunshot	Yes	Yes	Yes	No	No	-
Philando Castile	07/06/2016	Falcon Heights, MN	Gunshot	Yes	No	Yes	No	Yes	No conviction
Paul O'Neal	07/28/2016	Chicago, IL	Gunshot	Yes	Yes	Yes	No	No	-
Terence Crutcher	09/16/2016	Tulsa, OK	Gunshot	Yes	Yes	Yes	No	Yes	No conviction
Keith Lamont Scott	09/20/2016	Charlotte, NC	Gunshot	Yes	No	Yes	No	No	-

Table 2. 71 Large U.S. Cities

High %Black Cities (18)		Low %Black Cities (53)					
City	**Pre-2014 %Black**	**City**	**Pre-2014 %Black**	**City**	**Pre-2014 %Black**	**City**	**Pre-2014 %Black**
Detroit	80.9%	Indianapolis	27.8%	Tulsa	15.0%	San Diego	6.4%
Baltimore	63.2%	Columbus	27.6%	Lexington	14.5%	Colorado Springs	6.2%
Memphis	63.0%	Toledo	26.9%	Sacramento	14.2%	Anchorage	6.1%
New Orleans	59.6%	Jersey City	25.7%	Oklahoma City	14.1%	Portland	6.0%
Cleveland	52.9%	Oakland	25.5%	Long Beach	13.4%	Henderson	5.7%
Atlanta	52.8%	Boston	25.1%	Omaha	13.0%	San Francisco	5.6%
Newark	50.4%	New York City	24.7%	Wichita	11.5%	Riverside	5.6%
District of Columbia	49.2%	Dallas	24.6%	Las Vegas	11.3%	Tucson	5.3%
St. Louis	47.9%	Pittsburgh	24.2%	Stockton	11.0%	Corpus Christi	4.5%
Philadelphia	43.2%	Houston	23.3%	Denver	10.1%	Lincoln	4.3%
Cincinnati	42.8%	Louisville	22.9%	Los Angeles	9.1%	El Paso	3.7%
Greensboro	41.9%	Virginia Beach	19.1%	Bakersfield	8.6%	Albuquerque	3.4%
Milwaukee	39.4%	Fort Worth	18.7%	Fresno	8.5%	Mesa	3.4%
Buffalo	37.0%	Arlington	18.4%	Plano	7.7%	San Jose	3.2%
Charlotte	35.4%	Minneapolis	18.0%	Austin	7.6%	Honolulu	2.7%
Chicago	31.8%	Aurora	16.4%	Seattle	7.2%	Anaheim	2.5%
Kansas City (MO)	29.2%	Fort Wayne	16.1%	San Antonio	7.1%	Santa Ana	1.2%
Nashville	28.2%	St. Paul	15.9%	Phoenix	7.0%		

Table 3. Large U.S. Cities: Summary Statistics

	Full Sample	2012-2013	
		High %Black Cities	Low %Black Cities
	1	2	3
Panel 1. Outcomes (City-Year-Quarter Level)			
Arrest			
Arrest Rate (Arrestees per 1,000 population)	12.84	19.35	12.68
	(6.34)	(8.37)	(5.90)
Black Arrest	4.85	12.87	3.43
	(4.52)	(6.45)	(2.51)
White Arrest	6.39	4.54	7.43
	(3.96)	(2.94)	(4.01)
Felony Arrest	2.06	2.77	2.05
	(0.86)	(1.03)	(0.80)
Misdemeanor Arrest	9.63	14.95	9.53
	(5.28)	(7.39)	(4.79)
Crime Rate (Crimes per 1,000 population)			
Homicide	0.03	0.06	0.02
	(0.03)	(0.04)	(0.01)
Robbery	0.71	1.25	0.57
	(0.51)	(0.49)	(0.46)
Aggravated Assault	1.12	1.66	0.89
	(0.70)	(0.76)	(0.53)
Burglary	2.15	3.20	2.21
	(1.11)	(1.23)	(1.11)
Larceny	6.73	7.57	6.80
	(2.23)	(1.85)	(2.21)
Motor Vehicle Theft	1.30	1.73	1.18
	(0.82)	(1.04)	(0.74)
Panel 2. City Characteristics (City-Year Level)			
Population	735,145.50	545,871.09	746,032.75
	(1,006,981.49)	(301,459.16)	(976,216.09)
% Black	0.21	0.48	0.12
	(0.18)	(0.13)	(0.08)
% Male	0.49	0.48	0.49
	(0.01)	(0.01)	(0.01)
% Aged 25-64	0.54	0.54	0.54
	(0.03)	(0.02)	(0.03)
% High School Diploma	0.28	0.27	0.27
	(0.05)	(0.05)	(0.05)
% College Degree	0.12	0.13	0.11
	(0.06)	(0.05)	(0.06)
Poverty Rate	0.20	0.27	0.19
	(0.06)	(0.07)	(0.05)
Unemployment Rate	0.09	0.13	0.09
	(0.04)	(0.05)	(0.03)
Median Household Income ($)	51,143.84	38,882.45	52,281.11
	(13,349.76)	(10,232.89)	(10,570.15)
Police Officers per 1,000 Population	2.26	3.55	1.84
	(1.06)	(0.94)	(0.67)
Observations	1,362	136	398

Notes: Each cell contains the mean and standard deviation (in parenthesis).

Table 4. Large U.S. Cities: Effects of Highly Publicized Police-Related Deaths on Arrest

	Arrest					
	All		Black Arrest	White Arrest	Felony Arrest	Misdemeanor Arrest
	1	2	3	4	5	6
Panel 1.						
Post2014Q3 × High%Black	-0.240***	-0.234***	-0.259***	-0.176***	-0.100*	-0.275***
	(0.060)	(0.061)	(0.061)	(0.064)	(0.057)	(0.071)
Panel 2.						
Post2014Q3 × High%Black × HighProfileQuarter		-0.206***	-0.236***	-0.148**	-0.063	-0.253***
		(0.056)	(0.057)	(0.058)	(0.049)	(0.065)
Post2014Q3 × High%Black × LowProfileQuarter		-0.263***	-0.283***	-0.205***	-0.138**	-0.299***
		(0.071)	(0.070)	(0.075)	(0.068)	(0.082)
Observations	1279	1279	1273	1279	1279	1279
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
City-Level Time-Varying Controls		Yes	Yes	Yes	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is city-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000 population.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 5. Large U.S. Cities: Effects of Highly Publicized Police-Related Deaths on Homicide

	Homicide			
	All		Black Victim	White Victim
	1	2	3	4
Panel 1.				
Post2014Q3 × High%Black	0.120**	0.134***	0.145***	0.085
	(0.049)	(0.050)	(0.052)	(0.061)
Panel 2.				
Post2014Q3 × High%Black × HighProfileQuarter		0.198***	0.179***	0.141**
		(0.055)	(0.055)	(0.065)
Post2014Q3 × High%Black × LowProfileQuarter		0.068	0.110*	0.027
		(0.063)	(0.064)	(0.078)
Observations	1402	1402	1402	1402
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes
City-Level Time-Varying Controls		Yes	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is city-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 6. Large U.S. Cities: Effects of Highly Publicized Police-Related Deaths on Other Violent Crimes and Property Crimes

	Robbery		Aggravated Assault		Burglary		Larceny		Motor Vehicle Theft	
	1	2	3	4	5	6	7	8	9	10
Panel 1.										
Post2014Q3 × High%Black	-0.007	0.007	0.029	0.030	-0.011	-0.002	-0.004	-0.006	-0.034	-0.009
	(0.044)	(0.043)	(0.031)	(0.033)	(0.035)	(0.033)	(0.026)	(0.025)	(0.048)	(0.047)
Panel 2.										
Post2014Q3 × High%Black × HighProfileQuarter		0.047		0.064**		0.050		0.043*		0.052
		(0.034)		(0.030)		(0.031)		(0.024)		(0.042)
Post2014Q3 × High%Black × LowProfileQuarter		-0.035		-0.005		-0.055		-0.055*		-0.071
		(0.055)		(0.042)		(0.043)		(0.032)		(0.056)
Observations	1403	1403	1379	1379	1403	1403	1387	1387	1403	1403
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City-Level Time-Varying Controls		Yes		Yes		Yes		Yes		Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is city-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 7. Robustness Check

	Arrest	Homicide		Arrest	Homicide
	1	2		3	4
Panel 1. High%Black = I(%Black≥70th percentile %Black)					
Post2014Q3 × High%Black	-0.207***	0.132***	Post2014Q3 × High%Black × HighProfileQuarter	-0.201***	0.196***
	(0.057)	(0.046)		(0.052)	(0.050)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.214***	0.068
				(0.067)	(0.056)
Observations	1279	1402		1279	1402
Panel 2. High%Black = I(%Black≥65th percentile %Black)					
Post2014Q3 × High%Black	-0.171***	0.087*	Post2014Q3 × High%Black × HighProfileQuarter	-0.161***	0.148***
	(0.058)	(0.046)		(0.054)	(0.052)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.181***	0.024
				(0.066)	(0.055)
Observations	1279	1402		1279	1402
Panel 3. Continuous DD					
Post2014Q3 × %Black	-0.595***	0.237*	Post2014Q3 × High%Black × HighProfileQuarter	-0.558***	0.388**
	(0.142)	(0.131)		(0.128)	(0.154)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.632***	0.085
				(0.167)	(0.139)
Observations	1279	1402		1279	1402
Panel 4. WLS (Weight: Population)					
Post2014Q3 × High%Black	-0.123**	0.156***	Post2014Q3 × High%Black × HighProfileQuarter	-0.098	0.181***
	(0.061)	(0.050)		(0.060)	(0.052)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.149**	0.132**
				(0.066)	(0.058)
Observations	1279	1402		1279	1402
Panel 5. WLS (Weight: %Black)					
Post2014Q3 × High%Black	-0.213***	0.104**	Post2014Q3 × High%Black × HighProfileQuarter	-0.176***	0.170***
	(0.058)	(0.051)		(0.056)	(0.059)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.254***	0.035
Observations	1279	1402		1279	1402
Panel 6. Outcome: Arrest or Homicide Rate					
Post2014Q3 × High%Black	-4.281***	0.010**	Post2014Q3 × High%Black × HighProfileQuarter	-4.017***	0.015***
	(1.011)	(0.004)		(0.976)	(0.005)
			Post2014Q3 × High%Black × LowProfileQuarter	-4.556***	0.004
				(1.075)	(0.003)
Observations	1279	1402		1279	1402
Panel 7. High%BlackPoliceGap = I(High Black Police Underrepresentation)					
Post2014Q3 × High%BlackPoliceUnderRep	-0.162***	0.159***	Post2014Q3 × High%Black × HighProfileQuarter	-0.165***	0.185***
	(0.061)	(0.051)		(0.055)	(0.055)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.160**	0.133*
Observations	1279	1402		1279	1402
Panel 8. Spillover Effects					
Post2014Q3 × High%Black	-0.226***	0.130**	Post2014Q3 × High%Black × HighProfileQuarter	-0.210***	0.195***
	(0.053)	(0.062)		(0.053)	(0.062)
			Post2014Q3 × High%Black × LowProfileQuarter	-0.243***	0.061
				(0.056)	(0.082)
Observations	1179	1242		1179	1242

Notes: Each column in each panel represents a separate regression. The unit of observation is tract-year-quarter. Robust standard errors are clustered at the tract level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 8. St. Louis: Summary Statistics

Variables	St. Louis		
	Mean	S.D.	Observations
Panel 1. Outcomes (Tract-Year-Quarter Level)			
Policing Outcome			
Arrest Rate	15.49	22.99	1,272
Self-Initiated Activity Rate	177.75	139.52	1,272
Crime Rate			
Homicide	0.15	0.35	1,272
Robbery	1.46	1.49	1,272
Aggravated Assault	2.99	3.03	1,272
Burglary	3.59	2.62	1,272
Larceny	10.54	8.13	1,272
Motor Vehicle Theft	2.83	1.79	1,272
Panel 2. Tract Characteristics (Tract-Year Level)			
Population	3,004.82	1,235.53	318
% Black	53.21	36.50	318
% Male	48.13	5.27	318
% Aged 25-64	56.33	10.38	318
% High School Diploma	25.71	9.31	318
% College Degree	15.37	9.94	318
Poverty Rate	29.25	15.31	318
Unemployment Rate	16.08	10.28	318
Median Household Income ($)	33,995.21	14,194.43	318

Table 9. St. Louis: Effects of Highly Publicized Police-Related Deaths on Arrest

	Arrest					
	All		Black Arreset	White Arrest	Felony Arrest	Misdemeanor Arrest
	1	2	3	4	5	6
Panel 1.						
Post2014Q3 × PredomBlack	-0.188***	-0.190***	-0.170***	0.075	-0.174***	-0.167***
	(0.046)	(0.046)	(0.054)	(0.056)	(0.051)	(0.051)
Panel 2.						
Post2014Q3 × PredomBlack × HighProfileQuarter		-0.210***	-0.175***	0.011	-0.209***	-0.176***
		(0.048)	(0.055)	(0.058)	(0.058)	(0.054)
Post2014Q3 × PredomBlack × LowProfileQuarter		-0.148**	-0.159**	0.206**	-0.105	-0.147*
		(0.067)	(0.075)	(0.080)	(0.073)	(0.074)
Observations	1272	1272	1272	1272	1272	1272
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Census Tract Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Tract-Level Time-Varying Tract Covariates		Yes	Yes	Yes	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is tract-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, and median household income.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 10. St. Louis: Effects of Highly Publicized Police-Related Deaths on Self-Initiated Activity

	Self-Initiated Activity												
	All		Building Check	Business Interview	Occupied Car Check	Unoccupied Car Check	Directed Patrol	Foot Patrol	Investigation	Pedestrian Check	Problem Solving	Traffic Violation	Truck Inspection
	1	2	3	4	5	6	7	8	9	10	11	12	13
Panel 1.													
Post2014Q3 × PredomBlack	-0.141**	-0.131**	-0.433***	0.074	-0.112*	-0.401***	0.036	0.184*	-0.164***	-0.380***	0.014	0.156	-0.455***
	(0.063)	(0.062)	(0.135)	(0.105)	(0.059)	(0.101)	(0.143)	(0.102)	(0.047)	(0.061)	(0.083)	(0.118)	(0.117)
Panel 2.													
Post2014Q3 × PredomBlack × HighProfileQuarter		-0.172***	-0.467***	0.069	-0.146**	-0.425***	-0.025	0.085	-0.184***	-0.434***	-0.016	0.112	-0.480***
		(0.059)	(0.132)	(0.117)	(0.059)	(0.106)	(0.156)	(0.094)	(0.050)	(0.065)	(0.082)	(0.113)	(0.116)
Post2014Q3 × PredomBlack × LowProfileQuarter		-0.049	-0.363**	0.085	-0.042	-0.351***	0.160	0.386***	-0.124**	-0.268***	0.076	0.246	-0.402***
		(0.077)	(0.158)	(0.106)	(0.071)	(0.130)	(0.144)	(0.136)	(0.057)	(0.073)	(0.109)	(0.155)	(0.137)
Observations	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census Tract Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tract-Level Time-Varying Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is tract-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, and median household income.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table 11. St. Louis: Effects of Highly Publicized Police-Related Deaths on Crime

	Violent Crime						Property Crime					
	Homicide		Robbery		Aggravated Assault		Burglary		Larceny		Motor Vehicle Theft	
	1	2	3	4	5	6	7	8	9	10	11	12
Panel 1.												
Post2014Q3 × PredomBlack	0.160***	0.150***	0.030	0.042	0.249***	0.262***	-0.124**	-0.134**	-0.007	-0.004	-0.013	-0.011
	(0.042)	(0.043)	(0.062)	(0.060)	(0.061)	(0.058)	(0.056)	(0.054)	(0.039)	(0.038)	(0.054)	(0.055)
Panel 2.												
Post2014Q3 × PredomBlack × HighProfileQuarter		0.188***		0.059		0.326***		-0.109*		-0.018		-0.026
		(0.047)		(0.063)		(0.061)		(0.059)		(0.036)		(0.060)
Post2014Q3 × PredomBlack × LowProfileQuarter		0.070		0.007		0.131		-0.185**		0.024		0.019
		(0.060)		(0.087)		(0.085)		(0.071)		(0.057)		(0.070)
Observations	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272	1272
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Census Tract Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tract-Level Time-Varying Controls		Yes		Yes		Yes		Yes		Yes		Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is tract-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, and median household income.

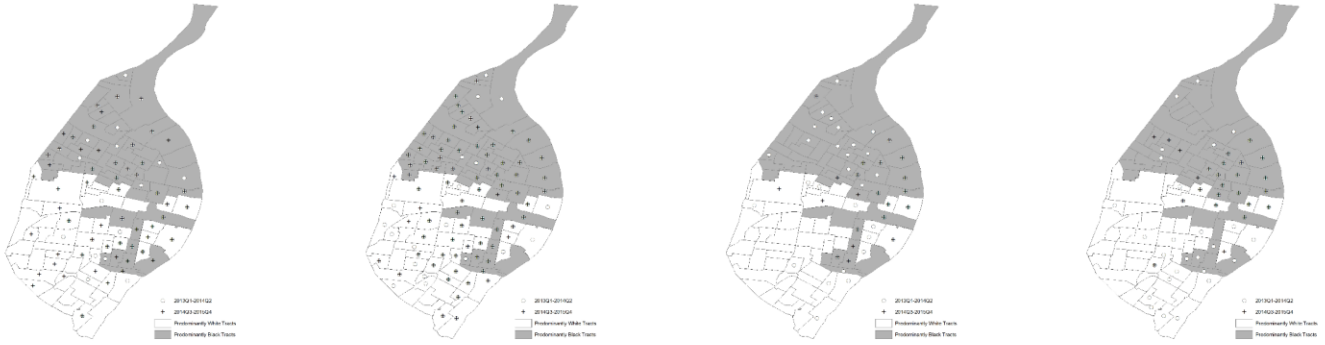
* Significant at the 10% level

** Significant at the 5% level

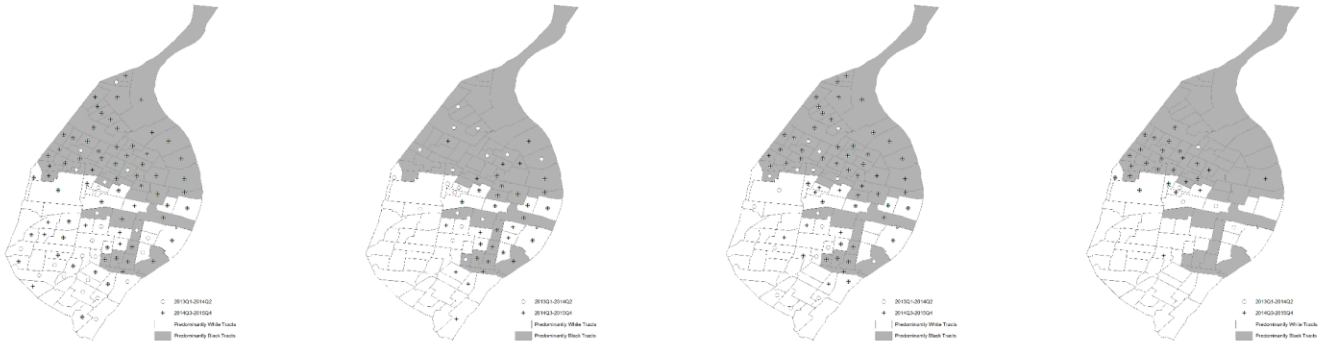
*** Significant at the 1% level

Online Appendix

Figure A1. St. Louis: Locations of 911 Emergency Call Responses of Eight Representative Officers before and after 2014Q3



(a) Total 911 Responses = 558 (b) Total 911 Responses = 560 (c) Total 911 Responses = 562 (d) Total 911 Responses = 567



(e) Total 911 Responses = 569 (f) Total 911 Responses = 573 (g) Total 911 Responses = 575 (h) Total 911 Responses = 586

Table A1. Large U.S. Cities: Effects of Highly Publicized Police-Related Deaths on Homicide by Circumstance

	Homicide by Circumstance			
	Felony Homicide	Non-Felony Homicide	Homicide Arising from Argument	Homicide in Undetermined Situations
	1	2	3	4
Panel 1.				
Post2014Q3 × High%Black	-0.062	0.054	-0.025	0.262**
	(0.101)	(0.095)	(0.096)	(0.108)
Panel 2.				
Post2014Q3 × High%Black × HighProfileQuarter	-0.048	0.119	0.010	0.309***
	(0.107)	(0.095)	(0.094)	(0.103)
Post2014Q3 × High%Black × LowProfileQuarter	-0.077	-0.013	-0.061	0.214
	(0.105)	(0.108)	(0.112)	(0.130)
Observations	1402	1402	1402	1402
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes
City-Level Time-Varying Controls	Yes	Yes	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is city-year-quarter.City-level covariates include the logarithms of percentage of blacks, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000 population.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table A2. St. Louis: Summary Statistics for Predominantly Black and White Tracts in 2013

	St. Louis: 2013	
	Predominantly Black Tracts	Predominantly White Tracts
	1	2
Panel 1. Outcomes		
Arrest Rate	22.05	13.86
	(19.45)	(29.27)
Self-Initiated Activity Rate	279.10	178.54
	(168.02)	(132.61)
Homicide Rate	0.20	0.03
	(0.36)	(0.10)
Robbery Rate	1.86	0.76
	(1.41)	(0.88)
Aggravated Assault Rate	4.29	1.18
	(2.80)	(1.18)
Burglary Rate	5.03	2.23
	(2.63)	(1.55)
Larceny Rate	11.16	10.74
	(5.89)	(9.46)
Motor Vehicle Theft Rate	3.56	2.27
	(1.66)	(1.59)
Observations	216	208
Panel 2. Tract Characteristics		
Population	2,621.26	3,411.67
	(1,141.16)	(1,179.04)
% Black	86.38	19.02
	(16.13)	(12.97)
% Male	47.00	49.43
	(5.77)	(4.27)
% Aged 25-64	50.50	61.71
	(7.17)	(9.68)
% High School Diploma	31.30	21.14
	(7.05)	(8.42)
% College Degree	8.48	21.90
	(4.86)	(8.72)
Poverty Rate	37.72	19.73
	(11.55)	(11.06)
Unemployment Rate	23.47	9.31
	(9.20)	(5.19)
Median Household Income ($)	25,621.02	43,478.64
	(9,697.54)	(12,206.95)
Observations	54	52

Table A3. St. Louis: Effects of Highly Publicized Police-Related Deaths on Arrest and Self-Initiated Activity (Officer-Level Analysis)

	Arrest	Self-Initiated Activity
	1	2
Panel 1.		
Post2014Q3 × JuniorOfficer	-0.082**	-0.157***
	(0.037)	(0.059)
Panel 2.		
Post2014Q3 × JuniorOfficer × HighProfileQuarter	-0.128***	-0.200***
	(0.038)	(0.059)
Post2014Q3 × JuniorOfficer × LowProfileQuarter	0.010	-0.071
	(0.044)	(0.070)
Observations	8640	8640
Year-by-Quarter Fixed Effects	Yes	Yes
Officer Fixed Effects	Yes	Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is officer-year-quarter. Robust standard errors are clustered at the officer level.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level

Table A4. Large U.S. Cities: Effects of Highly Publicized Police-Related Deaths on Justifiable Homicide by Police

	Justifiable Homicide by Police			
	Poisson		Negative Binomial	
	1	2	3	4
Panel 1.				
Post2014Q3 × High%Black	-0.457***	-0.454***	-0.451***	-0.447***
	(0.170)	(0.163)	(0.171)	(0.169)
Panel 2.				
Post2014Q3 × High%Black × HighProfileQuarter		-0.541**		-0.535**
		(0.215)		(0.215)
Post2014Q3 × High%Black × LowProfileQuarter		-0.356		-0.349
		(0.285)		(0.283)
Observations	1402	1402	1402	1402
Year-by-Quarter Fixed Effects	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes
City-Level Time-Varying Controls		Yes		Yes

Notes: Each column in each panel represents a separate regression. The unit of observation is city-year-quarter. Robust standard errors are clustered at the city level. City-level covariates include percentage of whites, percentage of males, percentage of population aged 25–64, percentage of population with a high school diploma, percentage of population with a bachelor's degree, poverty rate, unemployment rate, median household income, and the number of police officers per 1,000 population.

* Significant at the 10% level

** Significant at the 5% level

*** Significant at the 1% level